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THE NATURE

OF

GUNSHOT WOUNDS

OF THE

ABDOMEN,

AND THEIR TREATMENT:

BASED ON A REVIEW OF THE CASE OF THE LATE JAMES FISK, JR., IN ITS MEDICO-LEGAL ASPECTS.

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BY

EUGÈNE PEUGNET, M.D.,

SURGEON TO THE NORTH-WESTERN DISPENSARY; MEMBER OF THE NEW YORK PATHOLOGICAL SOCIETY, OF THE MEDICO-LEGAL SOCIETY OF THE CITY OF NEW YORK, AND OF THE MEDICAL SOCIETY OF THE COUNTY OF NEW YORK, ETC., ETC.

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CORRIGENDA.

PAGE 24—2nd line from bottom, read: *Three* mesenteric arteries.

" 34—9 *grape shot*, read: 9 *shell.*

" 35—2 fract. ilium *omitted*, P. 353, Bd II. abth 2, 1871.

" 64—8th and 9th lines from top, read: to corroborate *it* by that of.

TO

WILLARD PARKER, M.D.,

PROFESSOR OF CLINICAL SURGERY

IN THE

COLLEGE OF PHYSICIANS AND SURGEONS

OF THE

CITY OF NEW YORK,

This Monograph is inscribed,

WITH FEELINGS OF REGARD AND ESTEEM,

BY HIS FORMER PUPIL,

THE AUTHOR.

PREFACE.

THIS monograph was read before the Medico-legal Society of the City of New York, for the purpose of demonstrating the necessity of a change in the manner of conducting criminal investigations and in the introduction of expert testimony. As it is necessary in every argument to lay a foundation or basis for its support, and having selected the Stokes case as the most apt illustration of it, I was obliged to describe: the medical history of the case of the late James Fisk, Jr.; the nature of shock, and of gunshot wounds of the abdomen; and the physiological and toxical actions of morphine. Believing that the facts I have collected, and the views advanced, may be of interest, and possibly possess some value, I have rearranged the matter and divided it into five chapters, viz.: I. The history of the case of James Fisk, Jr. II. Description of shock. III. Penetrating gunshot wounds of the abdomen. IV. The physiological and toxical actions of morphine. V. The medical jurisprudence of the Stokes case.

68 WEST THIRTY-FIFTH ST., NEW YORK,
January, 1874.

CONTENTS.

Chapter		Page
I.	History of the Case of James Fisk, Jr.	3
II.	Description of Shock	14
III.	Penetrating Gunshot Wounds of the Abdomen	18
IV.	The Physiological and Toxical Actions of Morphine	36
V.	The Medical Jurisprudence of the Stokes Case	47
	First Trial	49
	Second Trial	75
	Third Trial	75
	Conclusions	88
	Bibliography	93

CHAPTER I.

HISTORY OF THE CASE OF JAMES FISK, JR.

THIS history is drawn up from the transcript of the notes of the court stenographer, and from the report of the inquest made by the coroner.

James Fisk, Jr., 37 years of age, in the prime of life, and of comparatively abstemious habits, received two pistol-shot wounds at about four o'clock on the afternoon of the 6th of January, 1872. The following is extracted from his *ante-mortem* statement: "I came through the outer door, and was going up-stairs, and had gone up about two steps, when looking up I saw Edward S. Stokes at the head of the stairs. As soon as I saw him I noticed he had something in his hand, and a second afterwards, I saw the flash, heard the report, and felt the ball enter my right side; a second shot was fired immediately afterward, which struck my left arm. When I received the first shot, I staggered and ran towards the door, but noticing a crowd in front, I ran back on the stairs again; was then assisted up-stairs and into this room."

4.20 P.M.—Dr. T. H. Tripler found him stand-

ing with his coat off. The Doctor first observed the wound in the left arm, but from his position thinking that there was something wrong, asked him if he was hurt anywhere else. He replied, "Yes," pointing to his abdomen. His pulse was then imperceptible, respiration estimated about 20, pupils of the eyes dilated, the lids drooped over the globe, and there was a dark circle under the eyes. The Doctor rolled a bandage around the wounded arm, gave him two ounces of brandy, and led him to the bed, then proceeded to make an examination of the wound in the abdomen. It was situated about five (5) inches above the umbilicus (navel), and two inches to the right of the median line. The wound was circular, and about half an inch in diameter. On passing in a probe about three and a half (3½) inches, it was found that the wound had an oblique direction downwards, slightly backwards, and from right to left.

4.50.—Pulse, 76, weak and irregular; resp., 26. He recognized Dr. Fisher, who had just come in, and gave him his hand. Two ounces of brandy were administered by the mouth, and a cold compress applied to the abdominal wound.

5.—Said that "he felt more comfortable, but had some pain in the bowels."

5.15.—Pulse, 74; resp., 24, and more regular. More composed; complained of pain, and appeared to be restless. A few swallows of water were given to him. He was lying on his back, with the left arm resting on a pillow. Countenance agi-

tated and pallid. Skin cool and moist. Pupils dilated.

5.45.—Pulse, 74; resp., 24. He was pale; skin cool, and covered with perspiration. Half a drachm of chloroform was then administered, as an anæsthetic, by inhalation, and at his own request. Whilst partially under the influence of it, Dr. James R. Wood carefully introduced a Nélaton probe about four (4) inches into the abdominal wound, but failed to find any evidence of the ball. Dr. J. P. P. White, before the withdrawal of the probe, felt a resisting substance, the tendon or muscular fibres of the rectus muscle. Dr. Fisher then examined, and also failed to find the ball. Dr. Wood found, after he came out from under the influence of the chloroform, that his pulse was more full than usual in cases of nervous shock. He was anxious, restless, and his eye growing dim. His extremities were cold, the lower ones quite so. Two ounces more of brandy were then administered. Drs. Wood, White, Th. Steele, F. W. Fisher, and Tripler present.

6.45.—Appeared uneasy and complained of pain in his bowels. The extremities were cold, but hot flat-irons were applied to them, which he said "made him feel more comfortable." Drs. Fisher and Tripler in attendance.

7.10.—After having given directions for making his will, duly executed it.

7.30, or thereabouts.—One quarter (¼) of a grain of morphine in solution was administered by the mouth. Dr. Tripler.

7.45.—Pulse, 74; resp., 26. Complained of pain, and asked Dr. Fisher "If he had ever eaten green apples in the country?" Said "it felt like an old-fashioned country green-apple bellyache," and asked for a stronger dose of medicine, saying that "He was as strong as an ox, and that it required four times as much to affect him as any ordinary person, as he had found that last week he had to take a very strong dose of medicine to move his bowels." One quarter (¼) of a grain more of morphine in solution was then administered to him by the mouth.

8.15.—Pulse, 72; resp., 30. Has been quiet at times, but mostly restless and uneasy. Complains of pain. Some eructation of wind, but no nausea. He said, "Give me more medicine;" and was then given ten (10) drops of Magendie's solution of morphine (equal to one half (½) of a grain of the salt*). Shortly after he said to Dr. Fisher: "Do you think that there is an even chance of my recovery?"

8.30.—Pulse, 73; resp., 35. Remarked that "he did not wish to be left alone." Asked for a drink of water, and it was given to him.

9.—Pulse, 73; resp., 35. "Complained of green-apple bellyache, and if he could only get rid of the pain he would be all right." Dr. Sayre states that "his pulse was good, steady, and regular, at 74 or 76. He was exceedingly pale, unusually white, but perfectly cool and collected in

* When Magendie's solution is dropped from a narrow-mouthed ounce vial, it will only *average* forty (40) drops to the drachm; therefore twenty (20) drops contain one (1) grain of the salt.

his mind. There was a paralysis of the entire surface of the body, the capillary circulation of the surface had stopped." Drs. L. A. Sayre, White, and Fisher present.

9.35.—Pulse, 72; resp., 32. His skin was warm and moist. Pupils *contracted.* Complaining of great pain in his bowels. Twenty (20) drops of Magendie's solution of morphine (equal to one (1) grain more of the salt) were then administered by the mouth. Drs. Fisher and Tripler.

9.45.—Pulse, 74; resp., 36. Was somewhat easier; at this time he was perfectly conscious and composed. He was given a few swallows of water; took it and drank it himself.

9.55.—Pulse, 80; resp., 34. Still complaining of griping pains in the bowels. A hypodermic injection of fifteen (15) drops of Magendie's solution was then inserted under the skin of the left arm (equal to three-quarters (¾) a grain more of the sulphate of morphine). In a few minutes he asked for some water, and made some other casual remarks.

10.45.—"Still complaining of great pain and distress in the abdomen, and then asked for another injection of morphine." One more of 15 drops of Magendie's solution (equal to three-quarters of a grain) was inserted into the arm.

11.—Pulse, 90; resp., 32. Skin cool and moist. Dr. Wood says: "I found Mr. Fisk in a better condition than I expected to find him. *It was recommended that the treatment should be discontinued.* He conversed with me, and told me that

he hoped everything would be done that could be; that he was worth saving. *He was more or less affected by the remedies that had been used.*"—Dr. Steele: "I think in a measure he had rallied. The temperature of his skin was better. He was perfectly rational."—Dr. Tripler: "About 11 o'clock the pupils were slightly *contracted*, but sensible to light."—Dr. Fisher: "Was sleeping, but easily roused, and drank some water."—Dr. Sayre (at about half-past 11): "He was asleep, *quite profoundly asleep*, but easily aroused." Dr. White was also present.

12 M.—Pulse, 100; resp., 26. Asleep, moved a little. Drs. Fisher and Tripler.

Jan. 7th, 1 A.M.—Pulse, 132; resp., 22. Patient awoke voluntarily and asked for a drink of water. Said that "he felt perfectly easy." His skin was warm. Pupils *contracted* and reacted to light. A cold compress was applied to the abdomen. Two ounces of brandy and water were given him.

1.30.—Sleeping quietly. Dr. Fisher alone.

2.—Pulse, 126; resp., 20. Whilst his face was being sponged off with water, he awoke and remarked that "He felt first rate." Two ounces of brandy and water were then given to him, and he soon fell asleep.

3.—Pulse, 124; resp., 22. Four ounces of urine drawn off with a catheter. Abdomen somewhat swollen. Two ounces of brandy and water were then given to him.

4.15.—Dr. White came in, and whilst conversing

with Dr. Fisher, Mr. Fisk awoke. On inquiry he said that "*He felt easy, asked for a drink of water, took it in his right hand and drank it, raising his head somewhat, and fell asleep again.*"—Dr. White: "At four o'clock his *pupils* were pretty well *contracted*, but reacted by moving the candle. Pulse, 128; resp., 22."

5 —Was *sleeping soundly.* Dr. Fisher spoke to him, but he made no answer.

5.20.—Pulse, 135; resp., 20, and irregular. Dr. Fisher: "I spoke and *endeavored to arouse him, but was unsuccessful.* I rubbed his extremities with ammonia, and applied the same to the nostrils; it seemed to produce no effect. I endeavored to force his mouth open to give some brandy and water." But the Doctor did not succeed.

6.30.—Dr. Fisher: "Pulse, 130, and weak; resp., 20, and *rather easier. Still unconscious.* Pupils still sensible to light. I rubbed his arms and limbs with ammonia. *Could not arouse him.*"—Dr. Tripler: "I sponged his surface all over with aqua ammonia, also administered an injection of four ounces of brandy and milk. At the same time applied mustard paste to the pit of the stomach and abdomen, and rubbed his feet with a similar paste."—Dr. Sayre: "At 6 or 7 o'clock, it was very early, I think about six o'clock. His pulse was very feeble, and more rapid; his respiration was very feeble; he was simply sinking and dying."—QUESTION: Labored and stertorous breathing? ANSWER: No. His respiration at that time was, I think, about fourteen, *twelve or fourteen slower* than *it was* the evening

previous; his pulse was much more rapid, I think over a hundred.

7.15.—Dr. Fisher: "Mrs. Fisk arrived and appealed to her husband for recognition. He was still unconscious and evidently sinking."

8.—Pulse, 130; resp., 18. Pupils *contracted* but sensible to light. A consultation was then held.—Dr. Wood: "I found Mr. Fisk *insensible and breathing heavily*, he was dying."—Dr. White: "About half-past eight he was gradually dying—perhaps that is a strong expression—he was *unconscious* and in a state of *coma*." QUESTION: Was he *breathing heavily?* ANSWER: *Yes, sir.* QUESTION: *Stertorous breathing*, as you call it? ANSWER: *Yes, sir.*—Dr. Steele: "I saw nothing to convince me but that the man would die." QUESTION: What convinced you of that? ANSWER: *His labored respiration*, the peculiar pallor of the skin, and the *inability* of Dr. Sayre, with *his immense strength, to arouse him.* He could not be *aroused* by any *ordinary means.* QUESTION: He was insensible to the touch? ANSWER: Yes, sir.

10.—Dr. Fisher: "Pulse, 130, and weaker; resp. 17, and irregular. *Still asleep.*"

"From that time forward there was a gradual diminution of the regularity of the pulse and respiration until he ceased to live, at ten minutes to eleven." QUESTION: When was it that the patient's *respiration became stertorous?* ANSWER: *A few hours previous* to his death. BY THE COURT: About how long *before* his death? ANSWER: About *an hour and a half or two hours* before his death.

He died at fifty minutes past 10 A.M.

POST-MORTEM.—On the 7th of January, 1872, at No. 313 West 23d Street, at 9.15 P M., assisted by Dr. E. G. Janeway, I made a post-mortem examination of the body of James Fisk, Jr. The post-mortem was made ten hours and a half after death. The body was well nourished. Rigor mortis well marked. The general appearance of the body was blanched. Post-mortem discoloration about neck, and posterior surfaces of the body. The pupils of both eyes were normal. On the right side of the abdomen six (6) inches below the right nipple, one and a half (1½) inches to the right of the median line of the body, six (6) inches above the umbilicus, and eleven (11) inches from the upper border of the sternum, was a wound, circular in appearance and half an inch in diameter.

There was a wound, oval in shape, half an inch in length by a quarter of an inch in width, on the anterior surface of the left arm, one inch above the bend of the elbow. A probe introduced into this wound passed upwards, backwards, and inwards through the tissues of the arm, and passing out of an opening on the posterior surface of the arm, five (5) inches above the olecranon process.

On introducing a probe into the abdominal wound *a quantity of gas* emitting a *fœcal odor* escaped. An abdominal section being made, the wound was found to extend through the abdominal walls, passing obliquely downwards and to the left. The adipose tissue of the walls of the

abdomen was two inches in thickness. Several small clots were found on the omentum. The *folds* of the *small intestines* were found *agglutinated* by recent *inflammatory exudation.* Ragged openings with bloody edges were found in the omentum, close to the attachment of the transverse colon, and in *the two knuckles* of the *upper* portion of the *ileum.* The *small intestines* were *empty,* the large contained fæcal matter. A ragged opening was found in the mesentery and in the sigmoid flexure of the colon. An opening was found in the peritoneum at a point midway between the anterior superior spinous process of the ilium and the pubes below the muscular fascicule of the psoas magnus, and terminating three and a half (3½) inches below the pubes in the thigh, close to the insertion of the psoas magnus, at which point a conical leaden bullet was found imbedded. It weighed two drachms and fifteen grains. There was half a pint of bloody fluid in the abdominal cavity. The kidneys and spleen were healthy. The liver was slightly fatty. The gall bladder contained a calculus the size of a hazel-nut. The *heart* weighed sixteen (16) ounces, *right side filled* with *coagula,* the *left side empty.* Structure of the walls of the heart was healthy, as were also its valves. Both lungs were free from disease.

Reflecting the scalp, it was found bloodless. Removing the calvarium, the brain was taken out and found to weigh fifty-eight (58) ounces; cerebrum, 51 ounces; cerebellum, 7 ounces, with pons

varolii, which weighed one ounce. The *brain was healthy.*

Death, in our opinion, was due to shock and peritonitis from a pistol-shot wound in the abdomen.

There were present at the post-mortem examination: Drs. James R. Wood, Lewis A. Sayre, John Carnochan, Marion Sims, Charles Phelps, T. C. Finnell, F. W. Fisher, Alfred Beach, and others.

(Signed) E. S. S. MARSH, M.D.

Sworn to, before me, this 8th day of January, 1872.

Coroner.

Such is the history of the case as presented by the prosecution's own witnesses, collated from the above-mentioned sources, carefully excluding, when possible, mere expressions of opinion, which of course had no direct bearings on the facts of the case.

As the description of the abdominal wound, in the post-mortem report, is neither clear nor concise, I will state that, according to the collective sworn evidence, the bullet, on entering the abdominal cavity, caused the first perforation of the peritoneum; then passing through the omentum, causing four more perforations of the peritoneum; thence through two knuckles (convolutions) of the ileum (small intestines), four more perforations of the peritoneum, and four of the small intestines; thence through the mesentery, two more peritoneal perforations; thence through the sigmoid flexure of the colon—whether it was the ascending or descending portion I know

not—with two more perforations of the peritoneum, a final perforation of the latter on its pelvic reflection over the psoas magnus muscle. There were, therefore, four (4) holes or perforations of the small intestines, two (2) of the large, and fourteen (14) perforations or distinct wounds of the peritoneum. The missile then passed below the muscular fascicule of the psoas magnus, and following the course of that muscle over the arch of the pubes, without causing any injury whatsoever to the innominata or haunch-bone, lodged near the trochanter minor of the femur or thigh-bone.

CHAPTER II.

DESCRIPTION OF SHOCK.

SHOCK is a depression of the vital forces, caused either by an injury or wound, and any sudden emotion, such as excessive grief, joy, or fear.

It varies in its degrees from simple prostration to collapse; so slight as to be scarcely appreciable, again so great as to prove instantaneously fatal. These degrees vary with the nature of the wound, the circumstances under which it has been received, and with the peculiarities of the individual.

In shock both the cerebro-spinal, or nervous system of animal life, and the great sympathetic, ganglionic, or nervous system of organic life, are affected in proportion to the extent of the injury and to the individual idiosyncrasy.

In mild cases the symptoms are much less marked than those I am about describing, and which appertain to the more severe forms of shock *collapse.*

"The patient lies in a state of utter prostration. There is a striking pallor of the whole surface; most marked from its contrast to the natural color in the face. The lips are quite pale and bloodless. There is a cold clammy moisture upon the skin, and often distinct drops of sweat upon the brow and forehead. The countenance has a dull aspect, and appears shrunken and contracted. There is a remarkable languor in the whole expression, and especially in the *eye*, which has lost its natural lustre, and is concealed by the drooping of the upper lids." The *pupils* usually dilated, or irregularly so—one more than the other. "The nostrils are usually dilated. The *temperature* is considerably reduced, and if the person be able he will complain of feeling cold, and perhaps shudder. Muscular debility is extreme—apparent at a glance in the condition of the lips and hands—occasionally even to relaxation of the sphincters. The *pulse* is gene rally frequent, sometimes irregular, always very feeble, perhaps quite imperceptible. In this latter case, although the ear may detect the fluttering action of the heart, the pulse does not reach the wrist. The *respiratory* movements are short and feeble, or panting and gasping, 'wanting the relief of sighs,' sometimes imperceptible, although in the majority of such cases some action of the diaphragm may be detected by careful observation." The *respiration is never stertorous.* "Vertigo and

dimness of vision are present. As the rule, there *is not* complete *insensibility*, although there is much variation in this respect, depending, no doubt, upon the injury; but the person is drowsy and bewildered, yet perhaps rational when roused. Sometimes the intellect is singularly clear, and the senses perfect; the hearing even painfully acute. In the less extreme cases there is often nausea and vomiting, with hiccup. The last is very variable in its occurrence.

"When a person recovers directly from a state of collapse he passes through the stages of what is termed *reaction*. This process, in the most favorable cases, is gradual, often occupying many hours. It may be many days before the system is thoroughly rallied, and the *several functions* have resumed their wonted harmony. Among the earliest symptoms of healthy reaction are improvement in the power and *rhythm of the pulse* and *fuller inspirations;* an occasional deep sigh is a very favorable sign; so is also the power of swallowing, and confirmatory of these an *increase* of the *temperature*. Vomiting is commonly one of the earliest symptoms. An important sign of still further improvement is an inclination to shift the position —to move from a supine posture—which is emphatically the posture of debility—to one side. Subsequently there is, for a time, some excess of action, but it may be gradual and very slight. The person is a little feverish. The skin becomes rather hot, the face flushed, the pulse is rather frequent, and perhaps bounding, the urine scanty and

highly colored; there is thirst, headache, and some restlessness. But at length the skin becomes moist, the person falls asleep, and awakes convalescent.

"Other things being equal, the *longer* the *symptoms* of *reaction* are *delayed* the more *unfavorable* is the *prognosis.* If at the *expiration* of *some hours* no *symptom* of its *commencement* appear, the patient's *condition* is certainly *desperate.*" *

When a case of shock terminates fatally, death invariably begins at the heart. If it be sudden, it is by syncope, or instantaneous paralysis of the heart's action; but if, on the contrary, the fatal result is delayed, or that the termination is progressive, then it is death by asthenia, or a gradual paralysis of the heart's action. In both cases the heart's action is arrested at its diastole (while dilated), and at the autopsy the two auricles of the heart and the right ventricle will be found distended with blood; the left ventricle less so, as its muscular resistance is greater. In this, shock acts like all the so-called cardiac poisons, which action is not due to any direct influence on the heart, but secondary to the one exerted on the nerve-centres, manifesting itself either by a sudden arrest or by a gradual diminution in the conducting power of the nerves.

I have said that the great sympathetic, or nerve of organic life, is more or less affected in shock. The strongest evidence of this is the lowering of

*Holmes, *System of Surgery*, Vol. I., p. 706, 1st ed. London, 1860.

the animal heat and the extreme pallor which indicate a vaso-motor paralysis. These nerves are principally derived from the sympathetic, and preside over the circulation of the blood in the arteries and capillaries, and if their action is diminished there is necessarily a diminution in the activity, if not a complete arrest, of the capillary circulation of the surface and alimentary canal; for in cases of shock it is well known that the absorbent powers of the stomach are seriously interfered with, and great circumspection is requisite in the administration of stimulants, for in case of non-absorption they will be rejected at the inception of reaction. The importance of this point will be fully appreciated when we enter into the discussion of the physiological action of morphine.

CHAPTER III.

PENETRATING GUNSHOT WOUNDS OF THE ABDOMEN.

THESE wounds are, *prima facie*, exceedingly dangerous, owing to the lesion of the peritoneum. However, injuries of this membrane are not by any means as fatal as they were formerly supposed to be, for the numerous recoveries from the operations for strangulated hernia, and from the formidable operation for ovarian dropsy, which, not later than 1856, an eminent German gynæcologist * con-

* Scanzoni, *Diseases of Females*, p. 571, 4th Am. ed. 1861.

demned as a "surgical temerity," are now of daily occurrence—one surgeon alone * having performed it 500 times, and is now progressing towards the completion of his first 1,000 cases, the percentage of his recoveries being about 80 per cent. Then, as regards gunshot wounds, the statistics of the Crimean war give 10 per cent. of recoveries; our civil war, 24 per cent.; of the French army, in the Franco-Italio-Austrian war, over 34 per cent. †; whilst the Prussian, in the Austro-Prussian of 1866, and the German in the Franco-German of 1870, show a still greater increase in the percentage. Moreover, during the latter war, the surgeons ‡ in charge of the lazarets at Carlsrhue observed that the gunshot wounds the most frequently fatal were those in which foreign substances had lodged in the peritoneal cavity, giving rise to suppurative inflammation.

Penetrating wounds of the abdomen may be either simple, without any lesion of the viscera, or complicated with wounds of the liver, spleen, pancreas, kidneys, stomach, small and large intestines, and bladder. The former are necessarily less fatal than the latter. But the numerous instances of recovery found in the annals of surgery, from the ninth volume of *The Philosophical Transactions* of 1737, down to the October, 1873, issue of *The*

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* T. Spencer Wells, *Diseases of the Ovaries*, 3d ed. 1873.

† Chenu, *Statistique Medico-chirurgicale de la campagne d' Italie en* 1859-60. Paris, 1869.

‡ Socin and Klebs, *Chirurgische und Pathologische anatomische Beiträge zur Kriegsheilkund.* Leipzig, 1872.

American Journal of Medical Sciences, are sufficient not to warrant any one's asserting—never mind how high he may stand, or what the extent of his experience may be—that a wound causing four perforations of the small intestines, two of the large, and fourteen of the peritoneum, is "inevitably fatal," unless the post-mortem proves beyond a doubt that *death resulted* from the *immediate effects* of the *wound*.

It may be stated that there is no recorded case of recovery from a wound exactly like this one, *ergo*, no one has recovered from as formidable a wound. Such statements are unworthy of consideration, and it would be impossible to cite all the cases in this monograph proving it. I will, with the following exceptions, refer skeptics to the authorities referred to in the bibliography. Inspector-General Taylor, C.B., reports the case of a man who died of cholera six years after receiving a gunshot wound of the abdomen, and thus describes the injured part of the small intestines: "The intestines, neither there nor elsewhere, were morbidly adherent, but the folds of intestines immediately opposed to the cicatrix presented a line of contraction, as if a ligature had been tied around the gut. The same appearance existed in two other places." A high authority, M. T. Longmore, believes that "it seems more likely that the gut was contused than perforated, and that contraction gradually supervened, especially as no adhesions were found; and when wounded, the symptoms were so slight as to have led to the supposition that the ball had

gone round the abdominal wall."* This is *à priori* reasoning and untenable; for every pathologist knows that adhesions between the intestines, or to the peritoneal parietes, although usual, and I may say the rule, do not invariably occur as a result of peritonitis, especially when it is as slight as it must have been in this case, and that bands of plastic lymph will form around the intestine, which would be more likely to have occurred in this instance. Moreover, contusions of the intestines, which vary in degree with the velocity with which the ball brushes by them, are even in most instances more serious than a direct perforation; for, in the first place, the injured parts of the intestine may slough off in from six to fifteen days, and the intestines opening in such a manner will pour out their feculent matter into the cavity of the abdomen. Whilst with instantaneous perforation, unless the discharge takes place immediately, the bulging or puffing out of the mucous lining of the intestines, caused by the action of their longitudinal and circular contractile fibres, closes the opening, and the ensuing peritonitis—*Nature's agglutinating process*—removes all danger from that source. There is also a mechanical process, which I will presently describe, that tends to prevent extravasation, unless there is sloughing or complete destruction of the calibre of the intestines.

Dr. Volkmann† reports seven cases of penetrating gunshot wounds of the abdomen recovering

* Holmes, *System of Surgery*, Vol. I., p. 67.

† Volkmann, *Deutsche Klinik*, Jan. 4, 1868.

under his observation in the Austro-Prussian war of 1866. In two the stomach, one the liver, and two the small intestines were wounded; moreover, it was recognized in the latter by the escape of their contents.

The statistics show that wounds of the small intestines are more dangerous than those of the large.

Death from those wounds may result in the first thirty-six hours, from shock or hæmorrhage: from the first, when reaction has taken place, there is no further danger to be apprehended; and from the second, if a large vessel has been wounded, death would take place almost instantaneously, whilst from a small vessel hæmorrhage might only then occur after reaction from shock, and thus lead to a fatal result. After thirty-six hours the danger would be from peritonitis (inflammation of the bowels) and septicæmia or blood-poisoning. The peritonitis ensues from two causes, the extravasation of feculent matter and the wounds.

From extravasation of feculent matter, the danger, in perforations without total destruction of the calibre of the bowels, is exceedingly remote, unless it takes place at the moment the wound is received. First, if the wound of the viscera is immediately opposite the one in the abdominal walls all the matter will escape externally, for the mechanical pressure prevents its escaping into the cavity of the abdomen. Then, if there are several perforations of the intestines, it must be borne in mind that it is not *de facto* a cavity, for the ab-

domen is filled with viscera lying in close contact with each other, which are moved by the action of the diaphragm (muscular septum between the thorax and abdomen) and abdominal muscles upwards and downwards with an equable continual pressure, which is without interval; for although there is an alternate action of the diaphragm and reaction of the abdominal muscles, causing a constant motion of the viscera, *this pressure is never-ceasing*, unless the abdominal parietes are so injured as to have lost their action. Therefore it is a physical impossibility that there should even be an escape of intestinal gas. The only organ which is not submitted to this law of universal pressure is the gall-bladder, owing to its peculiar situation in the inferior surface of the liver. Hence wounds of the latter are exceedingly dangerous.

M. Littré * reported, in 1705, the case of a lunatic, which fully illustrates this principle. This man inflicted on himself eighteen deep wounds with a long, sharp-pointed knife; eight penetrated into the cavity of the abdomen. The vomiting of blood and the evacuation of clots of blood proved, beyond a doubt, that the wounds involved the stomach and intestines; notwithstanding, in two months the man had entirely recovered. But, about eighteen months afterwards, he committed suicide by throwing himself out of the window. At the post-mortem examination it was found that the liver had been wounded, and that the external surface of its mid-

* John Bell, *Nature and Cure of Wounds*, Vol. II., p. 54, 1st Am. ed. 1807.

dle lobe was adherent to the parietal layer of the peritoneum, next the jejunum (small intestine), with a cut half an inch in length parallel with its transverse diameter, and that the portion lying deep was kept in close contact with a contiguous turn of the same bowel, the two convolutions adherent to each other, in one the cicatrix of the wound, and the other sound; and finally, one on the ascending colon, leaving a scar half an inch in length, which was adherent to the inner face of the peritoneum, by eighteen or twenty long, thread-like, fibrous bands issuing from the inner surface of one of the largest cicatrices in the abdominal parietes.

The following case, reported by Dr. Zena Pitcher,* of the U. S. A., in 1832, demonstrates the danger from extravasation when the universal pressure within the abdomen is destroyed, thus removing *Nature's compress*, and how it can be restored by a skilful application of the art of surgery: M. Miller was stabbed in the left side of the abdomen, about two inches above the groin; the wound was about three and a half inches in length, allowing a protrusion of several feet of the intestines. The ileum (small intestine) was diagonally cut in two; two inches of the lower portion of the mesentery was divided; the contiguous portion of the small intestine cut two-thirds across on its convex side; two other convolutions were transpierced, and the descending colon was partially cut open in its transverse diameter. These mesenteric arteries were first tied, the ends of the divided small intestines invaginated, or

* *American Jour. Med. Sciences*, Vol. X., old series, p. 43.

one slipped into the other and secured by stitches; the four other wounds were simply stitched; then the feculent discharges and blood removed by washing the intestines, the latter carefully replaced within the cavity, and the whole kept *in situ* by means of a compress and a well-applied bandage. Five months afterwards the patient was riding on horseback.

The case in question, Fisk's, affords a beautiful illustration of this principle; for there was not the slightest escape of intestinal gas at the time of the probing, or even eleven hours after the receipt of the injury, when the abdomen was tympanitic ("somewhat swollen"); but when the *parts* became *relaxed in death*, the introduction of the probe into the abdominal wound permitted the escape of "*gas emitting a fœcal odor.*"

The case of private A. J. Marker (in Circular No. 6) affords another striking instance of this *vis conservatrix naturæ*. A conoidal musket-ball entered the left hypochondriac region, between the eighth and ninth ribs, and lodged in the back, under the skin, a little to the left of the spinous process of the second lumbar vertebra. There was no discharge of feculent matter; but the next day the ball was removed by an incision made in the back, which was immediately followed by a copious fæcal discharge through the incision. Here the equable never-ceasing pressure had prevented the escape of feculent matter within the cavity of the peritoneum, and the moment an external opening was made, communicating directly with the wounded bowel (descending colon), this same pressure caused

an immediate evacuation through the artificial anus.

Great stress has been laid upon the danger of extravasation, from the peristaltic motion of the intestines; but this is greatly exaggerated, for this vermicular motion is not observed in operating for hernia. Mr. John Bell* had the opportunity of observing a child born without abdominal integuments, whose intestines were only covered with a transparent peritoneum, and failed to detect this motion either during the infant's sleep or whilst it was struggling and awake. With the same degree of attention he examined a man, whose abdomen had been entirely burst open by a fall, with a similar result. But that this action does take place under the stimulus of food or by irritating the stomach and intestines, there is no doubt of, and exciting it by too much stimulus or food must be carefully avoided.

The *peritonitis*—resulting from gunshot wounds—that is, not depending upon the irritation produced by the presence of foreign substances—is generally self-limited and non-suppurative, therefore the *vis medicatrix naturæ*. But if excessive, will even then, in a few instances cause death in from thirty-six hours to a week.

The great danger is from *septicæmia;* for as in this case (Fisk's) there were no artificial means by which drainage could take place; it might have occurred at any time after the third day; but even then,

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* *Op. cit.*

not as likely as in cases in which foreign substances remain within the cavity. These constitute what may be considered as the primary fatal accidents of this class of wounds; but there are others which, occurring at a later period, may be called secondary, and although involving important points in legal medicine, are not pertinent to the case under consideration.

In examining wounds of this kind the less probing and exploring done the better, not so much from fear of peritonitis, as of renewing the shock and of forming a cavity by displacing the viscera, which if wounded might lead to extravasation of their contents.

The treatment consists in allowing reaction to take place, and in case symptoms of nervous irritation manifest themselves, to then administer opium in small doses, increasing them if symptoms of peritonitis should declare themselves. When the temperature of the body is depressed, external warmth should be applied, excess of stimulants avoided; the food should be liquid and given in minute quantities for the first few days; milk is the best. No attempt should be made to move the bowels for the first few days, and then by enemas. In a word, the treatment should be *expectant, not anticipatory.*

The following case, reported by Danville,* in 1844, affords an excellent illustration of this treatment: "A man, about 25 years of age, was acci-

* *American Journal of Medical Sciences*, Vol. IX., new series, p. 212.

dentally shot. The contents of the gun entered about an inch below the navel, on the right side, and passed out about two inches above the right (hip) ilium, and three from the vertebral column. The wad or cartridge passed through, ignited, and set fire to the shirt, opposite the posterior opening. Looking at the case as hopeless, M. D. merely defended the wound; there was *neither probing nor poking.* No endeavor was made to remove extraneous substances. *Nature was left to her own operations, and she did her work well.* The wound digested properly, portions of the garment and other extraneous matter passed out by the posterior opening, and about 40 shot with them; 15 or 20 shot remain under the integuments, but the patient suffers no inconvenience from them, and he is now in excellent health." Another remarkable illustration of this principle was the case of Lockwood, who was shot by Magruder, in this city, in 1873. The ball entered the abdomen above the navel. Whether the intestines were wounded or not, it is impossible to state; but that one of the kidneys was wounded there is no doubt of. Immediately on the receipt of the injury, the patient *fell insensible* from *shock;* on recovering from the effects of it, was removed to Bellevue Hospital. There was *no probing* of the *wound,* and the *treatment* was *expectant. Nature also did her work well in this instance.* Yet there was *no drainage,* for the ball remained within the body. Notwithstanding, there was not one unfavorable symptom in consequence thereof.

It is possible that ultimately, in Fisk's case, an *extra-peritoneal extravasation* might have taken place, through the outer perforation of the sigmoid flexure of the colon into the lacerated tissues along the course of the psoas magnus muscle, and have given rise to fæcal abscesses, which, although not usually fatal, are still a source of annoyance and very trying to the surgeon. However, the following case of Simon,* of Heidelberg, demonstrates that even then science is not at a loss. The patient had received a gunshot wound, the missile, passing through the ilium (haunch-bone), had injured the ascending colon at the point where it joins the cæcum, and a considerable amount of tissue had been lost. In consequence of this injury fæcal abcesses, extensive destruction of connective tissue, and fæcal fistulæ followed, which opened at different points in the inguinal and lumbar regions. The condition of the patient not improving about eighteen (18) months after the receipt of the injury, that learned and skilful surgeon laid open the entire tract of the wound by a deep incision; at the posterior portion, the dorsum of the ilium had been pierced immediately under the crest: the upper border of the hole made by the ball was removed with the bone forceps, in order to establish a continuity with the opening made through the tract of the wound. The canal thus made measured a foot, or twelve inches in length, and was about two inches in

* *Verhandlungen der deutschen Gesellschaft zur chirurgie*, Erster Congress, p. 59, 1872.

depth. At the bottom of the opening was seen a defect, or opening in the colon about four-fifths ($\frac{4}{5}$) of an inch in diameter, through which the mucous membrane protruded. The Doctor then freshened the edges of this opening in the intestine, and brought the wound together with sutures. These separated, however, and the mucous membrane again protruded. Different obdurators were made use of, but the retention could not be accomplished, in consequence of which the closure was brought about by two arched flaps taken from the skin of the chest and buttocks. The adhesions of the flaps succeeded, with the exception of a small point anteriorly, from which fæcal matter still escaped. This opening, only large enough to admit the point of the finger, it is proposed will be the object of another operation. The patient is at present in a more favorable condition; fæcal infiltration has ceased, and cleanliness is accomplished by means of a compress.

Dr. Adler, of this city, has related to me an interesting case occurring under his own observation in the late Franco-German war, which demonstrates how this extravasation could be arrested, if not prevented, when it occurs through perforations in the sigmoid flexure. A man had received a gunshot wound of the pelvis. The missile passed into the obdurator foramen (an opening between the hip-joint and seat) of one side, into and through the rectum, and out of the foramen on the opposite side. There was a constant evacuation of feculent matter through the two openings, which the Doctor

at once arrested by dividing the sphincter *ani.* For, aside from constriction, it is the resistance of the sphincter which permits of the accumulation of fæcal matter in the lower portion of the colon and in the rectum; and when its action is paralyzed by a free section, there is necessarily an unobstructed flow *per vias naturales.*

I do not lay any claims as to originality of thought or observation as to the views herein expressed, which, I regret to say, have been apparently ignored by our more modern teachers and practitioners of surgery, *without having ever been controverted or refuted.*

It may not be amiss to refer to the therapeutical application and *action of morphine* in this class of wounds. It is usually administered, in the first place, for the purpose of arresting, or, as suggested by some, of preventing shock, and to allay nervous irritation; then, with the intention of controlling the peristaltic action of the intestines, and finally, for the prevention of excessive peritonitis. It is thus administered either by the stomach or injected into the cellular tissue by the hypodermic method. The majority prefer the former, whilst others incline towards the latter.

It is well known that in shock there is a marked depression of the nervous system; and it must be borne in mind that, although usually general, it may still be circumscribed, and constitute the *commotion* of French writers, which, in some cases, may give rise to serious local disturbances. It will therefore be readily understood how a missile

inflicting wounds of the abdominal viscera will cause a severe *local* shock, paralyzing the action of the viscera, even causing a capillary stasis, which would prevent the immediate absorption of remedies. This is not mere hypothesis, for it is a physiological truism, and is maintained by clinical observation. Longet * has shown that section of the pneumogastric nerves delays the absorption of agents; Samuel,† that extirpation of the cæliac plexus of the sympathetic caused an excessive hyperæmia, due to a vaso-motor paralysis, of the mucous membrane of the stomach and intestines. I have observed this hyperæmia follow poisoning by veratrum album, and have demonstrated that it was due to a peculiar complex principle, the resinoid of that plant; and its hypodermic injection in animals will give rise to this hyperæmia. ‡ Therefore Samuel's experiments demonstrate that it is through a special action on the cæliac plexus, temporarily arresting or paralyzing its function. Arsenic, whether administered internally or hypodermically, has a somewhat similar effect. As long as the effects of this local shock, concussion, or paralysis continue, whether it is due to the effects of a direct injury or to those of toxic agents, there can be no absorption; and clinical observa-

* Longet, *Traité de physiologie.* Paris, 1861, Tome i., p. 379.

† Samuel, *Principes fondamentaux de l'histoire du système nerveux nutritif.—Jour. de la physiologie*, Paris, 1860, Tome iii., p. 580.

‡ *The Medical Record*, vol. vii., pp. 121, 133. These remarks apply only to the second stage, when the increased rapidity of the circulation is finally arrested and *stasis* occurs in consequence of the *arterioles* losing their contractile power.

tion certainly demonstrates that in these cases neither agents nor food will be absorbed until this arrest of the absorbing powers of the stomach and intestines, and of the local capillary circulation, has passed away. Therefore, if we administer morphine by the stomach, under such circumstances, it must, *ex necessitate*, remain there, gradually *accumulating*, until it is finally absorbed *en masse*. It is then evident that the *internal administration* of *morphine* before recovery from shock, especially in abdominal *commotion* or *concussion*, is not only *injudicious*, but *fraught* with *danger*. The same rule does not apply, however, to its *hypodermic* administration; for then, in those cases especially in which the general effects of shock are but slight, it will at once enter into the torrent of the circulation and produce that stimulating effect which tends to restore to the nerve-centres their wonted harmony of action.

For controlling the peristaltic action of the intestines.—It is not necessary to endeavor to control this at first, for the very nature of the injury arrests the motion until complete reaction has taken place. Therefore there is *no indication for undue haste in its administration.*

For the prevention and arrest of peritonitis.—To administer a drug to prevent the development of the *vis medicatrix naturæ* in penetrating gunshot wounds of the abdomen, is unworthy of discussion. To control excessive peritonitis, I can readily understand and appreciate the rules originally promulgated by Dr. Alonzo Clark for the

TABLE I.

WOUNDS OF ABDOMEN.

Page. Bd. II., Abth. 2, 1871.	CASES.			DEATHS.			RECOVERIES.									REMARKS.
	Penetrating.	Non-Penetrating.	Unclassified.	Penetrating.	Non-Penetrating.	Unclassified.	Stomach.	Liver.	Intestines.	Spleen.	Kidneys, ureters.	Bladder.	Penetrating.	Non-Penetrating.	Unclassified.	
349_1....	6	....	..	3	....	..	..	..	..	..	....	..	3	....	...	
350_1....	...	....	8	...	....	..	..	..	..	..	....	..	..	....	...	Result not stated.
350_2....	1	1	..	1	....	..	..	..	..	..	....	..	..	....	...	
351_2....	18	107	..	...	....	4	..	..	..	..	....	..	4	....	111	18 as visceral; 10 under treatment.
356_2....	4	....	13	...	....	..	..	..	..	..	....	..	..	....	...	Result not stated.
357_1....	1	....	..	...	....	..	..	..	..	..	....	..	..	....	...	
360_2....	2	3	..	...	....	..	..	..	..	..	1	..	2	3	...	
361_1....	...	....	6	...	....	..	..	..	..	..	....	..	..	....	...	Result not stated.
362_1....	14	3	..	9	1	..	..	..	..	..	....	..	5	2	...	8 as visceral; 6 thorax and [abdomen; 4 deaths.
365_1....	12	....	..	12	....	..	..	..	..	..	....	..	..	....	...	
365_2....	4	....	..	4	....	..	..	..	..	..	....	..	..	....	...	
368_1....	10	6	..	9	2	..	..	..	..	..	....	..	1	4	...	
368_2....	2	....	..	1	....	..	..	..	..	..	....	..	1	....	...	Protrusion of omentum; [recovery.
369_2....	7	2	..	7	....	..	..	..	..	..	....	..	..	2	...	
372_1.... Bd. II., Ab. 2, 1872.	6	2	..	4	....	..	..	..	1	..	....	..	2	....	...	1 recov.; fract. of ilium, [and perf. of colon.
376_2....	73	33	..	56	1	..	2	3	7	2	....	..	17	32	...	
380_2....	5	18	..	3	....	..	..	2	..	..	....	..	2	....	...	
386_2....	39	37	..	34	...	..	..	..	2	..	....	..	5	....	...	9 grape-shot; 4 deaths fr. [injury to spine.
388_2....	...	....	10	...	....	4	..	..	..	..	....	..	..	....	...	
390_2...	2	5	..	...	....	..	1	..	..	..	....	..	1	....	...	1 death from small-pox.
393_2....	3	10	..	1	....	..	..	..	..	..	....	..	2	....	...	
395_1....	2	....	..	..	....	..	..	1	1	..	....	..	2	....	...	
396_1....	4	....	..	2	....	..	..	..	..	..	....	..	2	....	...	
405_1....	7	16	..	...	....	..	..	..	2	..	....	..	7	....	...	
413_1....	...	7	..	...	...	..	..	..	..	..	....	..	..	7	...	
419_2....	...	....	2	...	....	1	..	..	..	..	....	..	..	....	1	
420_1....	2	....	..	...	....	..	..	..	..	..	....	..	..	....	...	Result not stated.
420_2....	3	13	..	...	....	..	..	..	1	..	....	2	3	....	...	
Total.	227	263	39	146	4	9	3	6	14	2	1	2	59	50	112	

Gunshot wounds of abdomen, 529; 9 from grape-shot; 159 deaths.

" " penetrating, 227: 146 deaths.

" " " recov., 59; probable, 22; tot., 81; average, $35\frac{72}{100}$%

" " " " " stomach..... 3

" " " " " liver..... 6

" " " " " intestines..... 14

" " " " " spleen..... 2

" " " " " kidneys..... 1

" " " " " bladder..... 2

Total of viscera recoveries..... 28

TABLE II.

WOUNDS OF PELVIS.

Page. Bd. II., Abth. 2, 1871.	Cases.			Deaths.			Recoveries.											Remarks.
							Fractures.											
	Penetrating.	Non-penetrating.	Unclassified.	Penetrating.	Non-penetrating.	Unclassified.	Ilium.	Pubes.	Ischium.	Sacrum.	Bones.	Bladder.	Bladder and Urethra.	Bladder and Rectum.	Rectum.	Viscera.	Unclassified.	
349_1	...	...	8	..	....	1	..	..	..	..	..	..	....	....	..	..	7	
350_1	...	...	11	..	..	..	..	..	..	..	..	..	....	....	..	..	...	No result.
351_1	21	170	72	1	....	12	..	..	..	..	18	4	....	....	..	3	205	Under obs. 20.
357_1	1	....	...	1	....	..	..	..	..	..	..	..	....	....	..	..	....	
360_2	...	....	14	..	....	2	..	..	..	..	..	..	....	....	..	..	....	7 injury of bones, [2 of viscera.
361_1	...	....	6	..	....	..	..	..	..	..	..	..	....	....	..	..	....	No result.
362_1	2	....	28	..	....	1	..	..	..	..	..	1	....	....	1	..	....	
365_2	4	1	...	..	....	..	..	..	..	..	..	..	....	....	..	..	....	No result.
369_2	...	4	..	..	....	..	..	..	..	..	..	..	....	....	..	..	4	
Bd. II., Ab. 2, 1872.																		
376_2	72	95	...	27	....	..	19	..	3	3	..	2	....	....	4	..	....	
380_2	5	40	..	2	....	5	8	..	..	..	..	..	....	....	..	3	...	
386_2	6	....	...	5	....	..	..	..	..	..	..	..	1	....	..	..	....	
388_2	...	....	5	..	....	3	..	..	..	..	..	..	....	....	..	..	....	
390_2	4	5	...	..	....	..	..	..	..	..	3	..	....	....	1	..	....	
393_2	...	....	10	..	....	2	..	..	..	..	4	..	....	....	..	..	....	
396_1	2	....	10	1	....	1	..	..	..	..	..	1	....	....	..	..	....	
405_2	4	6	37	..	....	..	1	..	..	..	19	3	....	....	1	..	....	
413_2	9	56	28	..	....	..	20	7	..	2	1	1	....	2	5	..	....	8 viscera compl. [with fract. of [bones, 15 shell
419_2	...	....	3	..	....	1	..	..	..	..	..	..	....	....	..	..	....	
420_1	2	....	...	2	....	..	..	..	..	..	..	..	....	....	..	..	....	
423_2	...	....	2	..	....	..	..	..	..	..	..	..	....	....	..	..	2	
424_1	12	8	...	7	1	..	..	..	..	..	..	..	....	....	..	..	....	Pelv. and abd.
Total.....	144	385	234	46	1	28	50	7	3	5	45	12	1	2	12	6	218	

Wounds of pelvis, 763; 75 deaths.
" " " penetrating, 144; recoveries, 33; *probable*, 65; total, 98; average, 68⅓ per cent.
" " " with fracture of bones, recoveries, 110, a large proportion of which were penetrating.

NET RESULTS INCLUDING PROBABILITIES.

Wounds of Abdomen.....	529	159	
" " Pelvis.....	763	75	1292 cases—234 deaths.
" " Abdomen penetrating.....	227	146	
" " Pelvis penetrating.....	144	46	
Total of penetrating wounds.....	371	192	Net recoveries, 179, or 48%.
Recoveries from wounds of Viscera Abdomen.....		28	
" " " " Viscera Pelvis.....		33	
Total recoveries of wounds of Viscera.....		61	34% on 179 recoveries from penetrating wounds.

Extracted from Cases of Military Surgery occurring in the Franco-German War of 1870–71, collected by Dr. E. Gurlt, and published in the Jahresbericht über die Gesammte Medecin, 1871, Bd. II., Abth. 2, and 1872, Bd. II., Abth. 2.

I have not made any attempt to collect data from the French, as the adverse circumstances under which they were placed, and the manifest improvidence of their medical department, would not yield a fair criterion of results.

treatment of idiopathic peritonitis; but they do not apply with the same force to that of the traumatic peritonitis following gunshot wounds of the abdomen; for the statistics show that this peritonitis is self-limited, adhesive, and curative, and that the great cause of mortality in this class of wounds, after recovery from the primary effects, is *septicæmia.* *

CHAPTER IV.

THE PHYSIOLOGICAL AND TOXICAL ACTIONS OF MORPHINE.

This is the most active alkaloid of opium, and in its pure state one grain of it is equal to six grains of the latter. When taken into the stomach, it passes directly into the circulation by endosmose, thus passing through the delicate mucous membrane of the stomach and the walls of the capillaries into the blood; but if, as previously mentioned, the capillary circulation is arrested, or partially so, this absorption or endosmosis is either prevented or delayed.

When introduced by hypodermic injection, it comes in direct contact with the walls of the capillaries, for in the cellular tissue there is no intervening mucous membrane, and the endosmose takes place much more rapidly. Perchance the injection may have been thrown into a vein; then the action

* Sims, *New York Medical Journal*, vol xvii., p. 385.

of the agent is much more rapid. Therefore the same rule of endosmose does not apply to this mode of administration as to that by the stomach. It has been found by some experimenters and observers that morphine itself, by its peculiarly irritating action, delays endosmose in the stomach. This only applies to cases in which the action of the peripheral nerve expansions is normal, thus causing, by reflex action, a capillary contraction; but as there is in shock a marked depression of the nervous system, this peculiar action of morphine does not make itself manifest until the nerve-centres have recovered their proper equilibrium, and even then the capillary circulation would be restored in all its activity, and the endosmose have taken place before the sentient nerves had sufficiently recovered themselves. *Capillary contraction takes place after the absorption of the morphine;* that is then due to its stimulating action on the sympathetic, thence on the vaso-motor nerves; and it is owing to this action that we make careful use of hypodermic injections of Magendie's solution to overcome the vaso-motor paralysis induced in cases of poisoning by arsenic, hellebore, and other hypothenisants or powerful nerve depressants.

There are in general two classes of individuals in which the action of morphine or opium manifests itself differently: "1, Those who are readily affected by its hypnotic action, and who suffer little or no inconvenience from its excitant effect upon the brain or its depressant action on the pneumogastric nerve; and 2, Those who are dis-

tressed by its deliriant or depressant effects, or both, to such a degree that its hypnotic action is altogether counteracted until it has passed away."*

I. On the Brain.—Its primary action is that of a stimulant or excitant; its secondary one that of a hypnotic and sedative, even to anæsthesia. When the drug is once absorbed, its specific and individual effects are determined by the nervous peculiarities of the individual. When these two effects on the nervous system are evenly balanced, the drug then has no very marked action, but at the furthest only an irritating or exciting one, which in large doses may cause active delirium.

II. On the Spinal Cord.—It has a marked sedative action. In cases of hypodermic injections this sedation is so rapidly induced at times on and in peculiar idiosyncrasies, that it gives rise to that alarming condition known as *spasmodic cramp of the respiratory muscles*. In these cases the chest becomes fixed, the respiratory movements are arrested in the lungs, the latter becoming contracted through the action of the pneumogastric on the bronchial tubes, down to their most minute ramifications. The circulation through the lungs is then arrested; the heart, no longer able to propel the blood through them, its right ventricle becomes distended and the pulse rapidly sinks, unless the *besoin de respirer*, which is intensely painful in these cases—for the sentient fibres of the pneumogastric nerve are unimpaired in their action—gives rise to

* Harley, *The old Vegetable Neurotics*, p. 122. London, 1869.

an inspiratory effect, relieving the distended heart, thus preventing a fatal issue.

The sedation is, however, usually progressive, gradually arresting the respiratory movements.

III. On the Pneumogastric Nerve.—This important nerve, owing to its distribution to various organs—the larynx, lungs, heart, pharynx, œsophagus, and stomach, its terminal branches joining the abdominal plexus of the sympathetic—is known as the *par vagum*, or wandering nerve. It is a mixed nerve, its sentient fibres arising from the brain. After its exit from the cranium it receives an important addition of motor fibres from the spinal accessory, and from the first and second cervical nerves. These arise from the spinal cord; the first, however, derives some fibres from the medulla oblongata, just below the origin of the pneumogastric, which also receives some additions from other cranial nerves, and one from the sympathetic.

The action of morphine on its sentient fibres manifests itself through the brain, whilst that on its motor fibres through the spinal cord. When the sedative action manifests itself on the spinal cord, causing a gradual diminution of the respiratory efforts, the conducting power of its sentient fibres being diminished by anæsthesia, this nerve fails to communicate to the brain, the *besoin de respirer*, which would, by reflex action through the medulla oblongata and spinal cord, make itself manifest by giving the necessary impulse to its motor branches, and to the other spinal nerves controlling the respiration, if the spinal cord itself were

not under the sedative or paralyzing action of the drug. I am aware that higher authorities than I look upon it as a gradual diminution in the conducting power of the nerves, but this is not logical, for in cases of opium-poisoning all these nerves respond to the electric current, showing that it is the nerve-centres—the central battery, not the conducting wires—that are at fault.

In certain idiosyncrasies, and in dogs, morphine gives rise to nausea, and even purging; this is also due to a peculiar action on this nerve.

IV. On the Sympathetic. — The stimulating action of morphine on the nerve of organic life has been already alluded to. The action of the heart, which is essentially controlled by it, remains unimpaired in all its vigor, until the physiological and physical impediments to the flow of blood through the lungs mechanically arrests the action of the heart, as an obstructed pipe will stop the working of a ram.

Whilst treating of the absorption of morphine, I stated that a contraction of the capillaries first manifested itself. But it is susceptible of proof that the prolonged toxic action of the drug will ultimately cause a dilatation, with consequent stasis of the blood. This is due to the final sedative action of the drug on the sympathetic, causing a partial paralysis of the vaso-motor nerves. A fine illustration of this is seen in those extreme cases of poisoning in which the surface of the body has a peculiar bluish appearance, owing to the dilatation of the integumentary capillaries, and the con-

sequent stasis in them of the non-oxidized or carbonized blood. The dilatation is also observable in the blood-vessels of the eye.

V. On the Pupils.—Contraction of the pupils is an early manifestation of the effects of opium. It is due to the stimulating action of the drug on the brain, thence transmitted through the motores oculorum, or third pair, and the fifth pair of nerves; but this influence is counteracted by the action of the fibres from the sympathetic nerve, which prevents a complete contraction. Hence, when the pupils are *pretty well contracted* they still respond to light; but when, towards the last, the stimulus to the sympathetic is overcome by the sedative action of the drug, the contraction becomes complete, the pupil is then insensible. In a fatal issue the pupils will, towards the last, dilate; this is perfectly natural, for the sedative action of opium is usually more pronounced, and first manifests itself on the cerebro-spinal axis. Therefore, the motores oculorum lose their power of contracting the pupil, and the sympathetic, as yet unimpaired in its action, favors the dilatation. The cases in which the contraction is complete occurs in those idiosyncrasies in which the sympathetic loses its power. This is not a mere assertion, for it can be maintained beyond controversy by physiological, experimental, and clinical evidence. Thus, section of the motores oculorum will cause dilatation of the pupil, whilst either that of the sympathetic in the cervical region, or of the fifth pair of nerves, will cause contraction of the pupil, moreover irritation,

only of the latter pair of nerves has a similar effect, and this either before or after section of the motores oculorum. We also see this dilatation, sometimes irregular, it is true, in cases of nervous shock following injury, or in the collapse caused by a powerful sedative. In shock the motor nerve is so much affected that the upper eyelid droops over the eyeball, and the pupil of the eye dilates; and, when the dilatation is irregular and incomplete, or is even not noticeable, it is owing to the counteracting influence of the sympathetic and fifth pair of nerves.

It may be argued that I am drawing things down to too fine a point; but every physiologist knows that certain injuries to the nerves, and certain agents, have a special action on this or that part of the animal economy; and every pathologist, that certain influences, whether it be either from a germ or a fermentation, or both combined, will cause special lesions.

This reasoning is also important as bearing on a statement in that standard work, TAYLOR ON POISONS, which to the casual observer is apparently a contradiction, and that our learned legal brethren frequently make use of to *confuse* the *medical expert* with, who is unfortunate enough to commit himself on the *contraction* of the *pupil* as a *sine quâ non* of opium-poisoning. For Taylor says that the *pupil* is sometimes *contracted* and sometimes dilated, which statement is thus rendered perfectly clear.

VI. ON THE CIRCULATION.—At first the arterial pressure is greater, and the rapidity of the circulation,

as indicated by the pulse, is increased, then reduced; first the pulse is frequent, then slow; but this is far from being an invariable rule, for it depends entirely upon the peculiar action of the drug, on the cardiac branches of the pneumogastric nerve, in various idiosyncrasies.

Thus, by dividing the pneumogastric nerves, we deprive the heart of their counteracting influence on the action of the sympathetic, therefore there is then an increased rapidity of the cardiac movements; then by galvanizing the peripheral ends of the divided nerve the heart beats more slowly, and with a current of sufficient power its action is arrested. Traube * has shown that digitalis (foxglove) injected into the veins of a dog will reduce in an hour the pulse to about one-fourth the number of beats; whilst injected into animals in which the pneumogastrics had been divided, it had no appreciable effect on the circulation. Gscheidlen † has found in experimenting upon animals that hypodermic injections of *morphine* first cause an increase in the frequency of the pulse, then a slowing of it; and if the pneumogastrics were divided, only an increased frequency. We see the converse of this in the action of veratrum (hellebore), which reduces the circulation by its action on the sympathetic nerve, and not through the pneumogastric.

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* Traube, *Versuche über die Wirkung der Digitalis.—Gesammelte Beiträge zur Pathologie und physiologie.* Berlin, 1871, Bd. I., s. 190 *et seq.*

† Huseman, *Die Pflanzenstoffe.* Berlin, 1871, p. 131.

Therefore in cases in which morphine acts as an irritant to the pneumogastric nerve, it will slow the action of the heart; and, when it acts as a depressant, paralyzing the action of this nerve, the rapidity of the circulation will be increased, for the action of the sympathetic is then uncontrolled, as the pneumogastric is deprived of its counteracting power. Finally, in toxic doses the heart's action is arrested by the previously mentioned mechanical process.

VII. On the Respiration.—This from beforementioned causes becomes slower, the inspiratory act prolonged, causing the so-called sighing respiration, and in cases of profound narcotism giving rise to labored and stertorous breathing.

In man, the respiration is usually about 35 in the first year, 25 in the second, 20 at puberty, and 18 in the adult; whilst the pulse is at 120, 110, 80, and 72. As regards its frequency compared to that of the pulse, the ratio would be one in four. When the system is under the influence of the drug, the ratio is increased to one in five, one in six, one in seven, one in eight, one in nine, and even more. But, although this is the rule, there are individual peculiarities in which the irritant action of morphine on the cardiac branches of the pneumogastric is so marked that the rapidity of the circulation as indicated by the pulse is decreased, and in others in which the sedative action on the sympathetic is so great that a similar result is induced.

VIII. On the Temperature.— In small doses morphine first causes a rise in the temperature,

then a depression. In toxic doses the lowering of the temperature is more marked. This is due in the first case to the vaso-motor stimulus, then the depression comes on in consequence of the partial motor paralysis arresting the capillary circulation. I have seen a quarter of a grain of morphine, given in two doses to a woman profoundly anæmic from a frightful hæmorrhage, cause the temperature to rise to 103°, nearly 5° above the normal ratio, accompanied with the most profound insensibility.

IX. Fatal Results.—When opium-poisoning terminates fatally, the length of time varies with the idiosyncrasy of the patient, the mode of its administration, and especially the circumstances under which it is taken or administered. For if taken in a large dose it may not be immediately absorbed, and if administered in comparatively small doses, and at intervals, its absorption, first delayed, may take place collectively. This accounts for its *cumulative action.* A fatal result usually occurs in from nine to twelve hours; yet it has been known to take place in less than three hours, and has been delayed eighteen hours and over. The patient becomes comatose, perfectly insensible, with labored or stertorous respiration, and cannot be aroused by any ordinary means. In some cases, especially in children, convulsions may manifest themselves.

The smallest dose known to have proved fatal in the adult is half ($\frac{1}{2}$) a grain of morphine, or about three (3) grains of opium; but two (2) grains of morphine given in one dose, or in divided doses, and collectively absorbed, is then, by its

cumulative action, usually considered a toxic dose. *Nevertheless*, no definite rule can be laid down as to the *precise quantity necessary to kill.*

X. Post-mortem Appearances.—There is usually an effusion of serum under the meninges of the brain and in the ventricles of the latter, also more or less congestion of both, or of the brain alone. The lungs may be congested, and the *right heart* will be found *distended*, whilst the *left one* is *contracted* and empty. But it is a mistake to rely exclusively on post-mortem appearances, as those of the brain and its meninges may not be present; whilst those of the lungs and heart may be overlooked or attributed to other causes, especially where opium-poisoning is not suspected, for the best of pathologists, *without a full history of the case*, might consider a slight pulmonary congestion as hypostatic, the distension of the right heart as a coincidence. The *post-mortem evidences* are therefore only of *cumulative value.*

A *chemical analysis* of the stomach would reveal the presence of morphine, provided it had been administered by the mouth and not entirely absorbed. But if it had been absorbed or administered hypodermically, that is, inserted under the skin, chemical examination of the kidneys and of the urine, if there were any left in the bladder, would then have to be made. Should there have been a free flow of urine, the poison may have been entirely eliminated from the system, and this *examination* would then only yield *negative results.*

CHAPTER V.

THE MEDICAL JURISPRUDENCE OF THE STOKES CASE.*

Ex errore citius emergit veritas quam ex confusione.—*Bacon.*

THE medical evidence in the repeated trials of this *cause célèbre* has given rise to so much comment, and there has been such a diversity of opinions in regard to it, that a critical analysis of its medical jurisprudence, as presented both by the prosecution and the defence, may render much that is apparently obscure clear, also further the interests of science, and in the future those of a proper administration of justice.

It is evident that the juries in the first and third trials were not directly influenced by the medical testimony—it is even doubtful if they took any notice of it. But, nevertheless, it may have had that indirect influence, so frequently made use of by our most successful criminal lawyers, of diverting the attention from the merits of the case. In this instance it may only have served as a wedge to cast a doubt in the minds of the jurors; for a wedge once well driven in will split the stoutest oak: *Cuneus cuneum trudit.* If the medical evidence failed to have any weight in the trials of this case, it was entirely due to the want of a proper appreciation of its strength on the part of the pros-

* Read before the Medico-legal Society of New York, at its Stated Meeting, December 26, 1873.

ecution. This can only be explained either by a complete ignorance of the first principles of medical jurisprudence, or else by a most profound contempt for it.

Ever since the regular introduction of medical evidence in criminal trials, *coaching* has assumed a prominent position. In Europe—especially in France and Germany—this coaching, or medical prompting, is never neglected, and through it the science of medical jurisprudence has there attained a proud and enviable distinction. But in this country the neglect of it—rather the want of a proper appreciation of its merits—has served to bring it, as well as medical expertism, into contempt. Our criminal annals overflow with such cases. Why, just think of it! We have had in the last few years, not even a decade, the Schoeppe-Steinecke, Wharton-Ketchum, Wharton-Vanness, Heggi-Seigfreid, Stokes-Fisk, and the remarkable *de lunatico-inquirendo* Train case, and sequence. In the first of these the Medico-legal Society of the City of New York, whilst yet in its infancy, achieved an imperishable renown by obtaining a new trial for the accused, and preventing, in the words of the learned Justice who presided at the last trial, A LEGAL MURDER.

Any of these cases would have been suitable for my theme, but the Stokes-Fisk case probably affords the best and most varied illustration of it.

This case, either for the prosecution or the defence, thus presents two points for consideration: —1. As to the cause of death; and 2. As to the

bearing the direction of the two wounds had on the relative positions of the aggressor and his victim at the time of the homicide.

FIRST TRIAL.

ANALYSIS OF THE CASE FOR THE PROSECUTION.

The learned District Attorney, in calling on to the stand his legion of medical witnesses to prove the death of James Fisk, Jr., evidently relied on cumulative proof, but in this overreached the mark. Had he simply rested this part of his case with the evidence of the Deputy Coroner in reference to the autopsy, he would have evinced a sound knowledge of medical jurisprudence. For a careful examination of his case—which could and should have been made as clear to him by his coach as it is in the preceding part of this *brochure*—would have shown him that there were dangerous shoals on which, unless avoided by exclusion, he might run aground if not wreck himself. But no! There had been rumors as to the probable cause of death bruited about. It was apparently deemed absolutely necessary to bring in overwhelming evidence, and in consequence thereof proved the theory of the defence.

The first witness was Dr. Wood. In his evidence, frankly yet cautiously given, the Doctor admitted the fact that the deceased was at one time under the influence of the narcotic. If the defence had then dared to exhibit their hand, he

would have been compelled to make some damaging admissions as regards the clinical history of the case. Had they then done so, the prosecution would probably have seen their aim, and endeavored to defeat it by exclusion.

The damaging admissions of Drs. White, Sayre, and Steele, compelled the prosecution to call Drs. Tripler and Fisher, with the minutes of the case, which only made matters worse.

According to the testimony of these gentlemen there were slight evidences of shock at twenty minutes past 4 P.M., an imperceptible pulse, a drooping of the upper eyelids, dilatation of the pupils, and a dark circle under the eye. The patient had not then found it necessary to lie down. At ten minutes of five, pulse 76 and regular, resp. 24; took two ounces of brandy; at a quarter past five, pulse 74, resp. 24 and regular, countenance pale and agitated, pupils dilated, skin cool and covered with perspiration. Dr. Wood found the pulse more full than usual in cases of nervous shock, the extremities cold, especially the lower ones, and the eyes were growing dim. At a quarter of seven, extremities still cold; at half-past seven, after the execution of his will, a quarter of a grain of morphine was administered by the mouth; at a quarter of eight, pulse 74, resp. 24, and complains of a green-apple bellyache, another quarter of a grain of morphine by the mouth; at a quarter past eight, pulse 72, resp. 30, quiet at times, but mostly restless,—a third of a grain of morphine by the mouth; at nine, pulse 73, resp. 35, com

plained of green-apple bellyache. Dr. Sayre says: "His pulse was good, steady, and regular, 74 or 76; he was exceedingly pale, unusually white, but perfectly cool and collected in his mind. There was a paralysis of the entire surface of the body, and the capillary circulation of the surface had stopped."

Up to this time there were *undoubted* evidences of *shock*, but no such symptoms as would indicate a *fatal termination*, save two of those described by Dr. Sayre, which even in themselves do not necessarily predicate a fatal result. Moreover, his evidence does not correspond with that of the other gentlemen, who were enabled to refresh their memory from the minutes, and it cannot be expected that a physician whose professional engagements are so extensive can carry every case in his mind.

All evidences of shock then terminated, and reaction clearly and unmistakably began to manifest itself. At twenty-five minutes of ten, pulse 72, resp. 32, *pupils* now *contracted*, skin *warm* and *moist*, and complained of pain in his bowels,—two-thirds of a grain of morphine given by the mouth; at a quarter of ten, pulse 74, resp. 26, perfectly conscious, took some water and drank it unassisted; at five minutes of ten, pulse 80, resp. 26, pain in bowels, and half a grain of morphine administered hypodermically; at a quarter of eleven, another half grain of the morphine administered hypodermically.

The physiological action of morphine on the respiration, as indicated by its corresponding ratio

to the frequency of the pulse, began to manifest itself at eleven. Up to ten the ratio had been from $3\frac{1}{12}$, $2\frac{1}{13}$, $2\frac{2}{5}$, $2\frac{3}{5}$, $2\frac{3}{35}$, $2\frac{1}{4}$, $2\frac{1}{18}$, to $2\frac{6}{17}$; at 11, $2\frac{3}{16}$; 12 M., $3\frac{11}{13}$; 1 A.M., $5\frac{6}{11}$; 2, $6\frac{3}{10}$; 3, $5\frac{2}{11}$; 4, $5\frac{4}{11}$; 5.20, $6\frac{2}{4}$; 6.30, $6\frac{1}{2}$; 8, $7\frac{2}{3}$; and at 10, $7\frac{11}{17}$. Its first physiological effect on the pupil was also observed at eleven o'clock in the evening.

At 11 P.M., pulse 90; resp. 32. Dr. Tripler says: "The pupils were slightly contracted, but sensible to light." Dr. Wood: "It was recommended that the treatment be discontinued. He *was* more or less *affected* by the *remedies* that had been *used*."

It is evident from the above, that the first decided narcotic effect observed was at 11 P.M. The rise in the pulse, from 74 at quarter of ten, to 90 at 11, an increase of 16, shows that it was the morphine inserted in the arm which acted, and that the grain and a half administered between half-past seven and twenty-five minutes to ten, by the mouth, had had no effect. This was owing to its non-absorption by endosmose.

At 12 M., pulse 100, resp. 26, he moved a little; at 4.15 A.M., pulse 128, resp. 22; *pupils* pretty well *contracted*, but reacted to the candle. Patient awakes spontaneously, takes a cup in his hand, raises his head somewhat, and *falls asleep again*.

Up to this time there were no evidences of pronounced narcotism. The physiological action of morphine on the pupil, which was first observed at eleven, was now more marked. The increasing

ratio between the respiration and pulse, which had been steadily progressing, was at this time one in five and four-sixteenths.

From this time forward we have undoubted evidences of the *cumulative* action of the morphine, for it is evident that the grain and a half in the stomach had not been absorbed until after one or two o'clock, for the symptoms, which began to make themselves manifest after five in the morning, would have declared themselves earlier. This absorption by endosmose could not take place until the equilibrium of the nerve-centres controlling the action of the stomach had been restored by complete reaction. Dr. Hammond, rebutting witness for the prosecution, recognized the possibility of the arrest of absorption in certain cases.

Thus at twenty minutes past five, with a respiration of nearly one to seven of the pulse, Dr. Fisher could not arouse him. This coma continued to increase progressively until eight. When the respiration was one to seven and two-ninths, the *pupils contracted*, but still reacted to light. The *respiration*, according to Dr. White, *stertorous;* and Dr. Steele says it was impossible for Dr. Sayre, with his immense strength, to arouse him. At 10, Dr. Fisher: pulse 130, resp. 17; a ratio of one of the latter to seven and eleven-seventeenths of the former. From this time forward there was a *gradual diminution* of the *regularity* of the *pulse* and *respiration*, until he ceased to live at ten minutes to 11. Moreover, according to

Dr. Fisher, the stertor began to manifest itself a few hours before death.

It cannot be denied that the evidence of Drs. White, Steele, and Fisher, affords irrefragable proof of the most profound narcotism at 8 o'clock; whilst, according to Dr. Fisher, it was marked as early as twenty minutes past five, and kept on increasing without intermission until the fatal termination at ten minutes to eleven. This within twelve hours subsequent to the administration of the last dose of morphine, and within sixteen hours after the first dose. The only symptom wanting is as regards the condition of the pupil between eight and ten minutes to eleven o'clock; whether it became perfectly contracted and insensible to light, or finally dilated, we know not, for there is *no* legal *record* of the *condition* of the *pupils* having been made after eight o'clock.

Most assuredly this evidence indicates death by *coma*, or death *beginning* at the *head*. For if the patient had died *instantaneously* from *shock* it would have been by *syncope*, owing to the immediate *paralysis* of the *heart's* action; or if the fatal result proceeding from shock had been delayed several hours, and had been progressive or gradual, it would have been *death by asthenia*, or from a *progressive paralysis* of the *heart's action;* whilst the *stertorous* or labored *respiration* was *unequivocal*, and positive *proof* of the absolute *recovery* of the patient from *shock*. Moreover, in *shock*, before the inception of reaction, the *respiration* is even "*wanting the relief of sighs.*"

AUTOPSY.—According to the testimony of all the witnesses there was no evidence of death either from shock or hæmorrhage; there were slight evidences of adhesive peritonitis, but not sufficient to cause death; whilst the right ventricle and auricle of the heart, that is, the *right heart* was *filled* with *coagula*, and the *left side empty.*

The condition of the heart militated against attributing death to shock. The lungs were reported healthy, and it is to be presumed that there was no evidence of hypostatic congestion, which, if it did exist, would have been of importance in connection with the state in which the heart was found. However, hypostatic congestion is not always made note of in post-mortem reports, as this condition in itself does not indicate *any lesion* of the *lungs.*

CASE FOR THE DEFENCE.

It was evident from the cross-examination of the witnesses for the prosecution, that the defence desired to establish the theory of opium-poisoning, and to prove that the patient did not die either from shock, peritonitis, or both combined. The prosecution, unwittingly I presume, assisted them —for too much evidence is sometimes dangerous.

The defence having by their skilful cross-examination laid the groundwork of their case, it was only necessary for them to establish that: I. This wound was not inevitably fatal; II. The indications in favor of possible recovery, as shown by the antecedents, clinical history, and post-mortem

of the deceased; and III. To prove by experts that the cause of death was not from the immediate effects of the wound, but in consequence of the treatment thereof.

I. THAT THIS WOUND WAS NOT INEVITABLY FATAL. —Dr. Wood, in his direct examination, for there was no cross, said: "I felt that this wound was a dangerous wound, although patients do recover from an injury of the intestines, and there are some wonderful instances of this kind on record. I knew, and said, although he may be wounded in his intestines, yet patients do get well." When asked to predicate his opinion on the post-mortem, he said: "Well, sir, I felt that the wound in the intestines would produce death; still, as I have stated before, they do not always."

Dr. White, on his re-direct, when asked if he had known of a case in which the small intestines were shot through and through twice, and the large intestines once, answered: "No; let me explain, there is no means of *knowing* the *extent* of the *injury* after *recovery*." The Doctor then stated, in answer to further questions, that "there was a case reported by Inspector-General Taylor." Then, in the re-cross, counsel for the defence read several cases from the Surgeon-General's circular, No. 6, and asked the witness: "Would that be evidence that the smaller intestines would be wounded?" *Answer:* "Yes, I think so."

In consequence of this evidence, furnished by the prosecution, it was only necessary for the defence to call on Dr. Carnochan to corroborate it.

The following *question* was then made: "Would you have thought that the case of Mr. Fisk was better or worse than the average, from the appearances after death and from what you saw of him during life?" *Answer:* "Well, there was nothing special to decrease the chances of his recovery, and there were some things favorable for his recovery. In the first place there was no extravasation of feculent material, and the extravasation of blood must have been very small. Those are the sources of death in the case where the ball entered the cavity of the abdomen. Patients die generally from extravasation or from internal bleeding, if they recover from shock, and if they live long enough, from peritonitis; those are the four sources of death."

The learned counsel for the prosecution endeavored to break down this forcible direct evidence by a severe cross-examination, but utterly failed as long as he based it on the merits of the case.

II. The Indications in Favor of possible Recovery as shown by the Antecedents, Clinical History, and Post-mortem of the Deceased.—1. *The antecedents of the deceased.*—The robust health, vigor of the constitution, and comparatively abstemious habits, had been proved by the evidence of the prosecution; but the defence, by their cross-examination, might have brought this out in bolder relief. 2. *The clinical history* of the prosecution showed that the patient had clearly and unmistakably *recovered* from *shock* and its *effects*. It also demonstrated that *during life* there was not the slightest

reason, beyond the situation of the wound, to suspect that any of the *intestines* or *viscera* had been *wounded.* This was confirmed by the evidence of Dr. Carnochan for the defence. The expert evidence of Drs. Jacobi and McCready, for the defence, in answer to the hypothetical question, proved that: All evidences of shock had subsided, and that it was even doubtful if there were any present. 3. *The post-mortem of the deceased* indicated that there had not been any hæmorrhage, and no danger was to be apprehended from secondary hæmorrhage; there had been no extravasation of feculent matter; the small intestines were empty, whilst the danger of the escape of fæces from the large intestines was very remote. Moreover, the peritonitis was of the adhesive form; it had agglutinated the small intestines, and was the curative effort of nature, and could, in all probability, have been controlled. Further, there was no foreign substance, such as cloth or wadding, or even a leaden ball, within the peritoneal cavity.

The defence did not enter as fully into this as they might have done. But they proved by Dr. Carnochan that: "He (Fisk) was under circumstances that would have admitted of cure; that is, there was no extravasation of feculent matter; there was not peritonitis enough to kill him, and there was no internal hæmorrhage;" so the *matter narrowed itself down to the effect of the wound.* "So far as the wound was concerned, that was a struggle between the amount of vitality that was in

the man and the treatment he received, and the other correlatives surrounding him."

III. To prove by Experts that the Cause of Death was not from the immediate Effects of the Wound, but in consequence of the Treatment thereof.—Had the defence carefully digested the clinical history so lucidly presented by the evidence for the prosecution, and which their coach had had ample time to collate, as described in the first chapter of this monograph, they would have drawn up a hypothetical question, first giving the essential facts up to the time of recovery from shock, including the treatment; then from eleven o'clock in the evening until five the next morning; again, from thence until death closed the scene; finally, the whole case, including the post-mortem appearances, which would have made out a much stronger case than that obtained by their exceedingly clumsy hypothetical question assuming the existence of certain facts that, in the majority of cases, will only serve to confuse the expert, compel him to ask for explanations, and finally give the cross-examiner an opportunity to practically nullify the influence of the direct examination on the minds of the jury. This is the great error frequently committed by counsel in the examination of experts. Almost regardless of what the answer may be, they draw up a question which they believe will influence the jury. This form may and does commonly apply to vulgar evidence, but in examining an expert the object should be to get a direct categorical answer, and thus produce the desired effect.

This is the question as given to Dr. Jacobi, the second medical witness of the defence: "A man in the prime of life, in unusual sound health, drinks moderately, receives a severe injury of a pistol-shot wound; the first shock was noticed about 4 o'clock in the afternoon; about half-past 4 the pulse was very low; at half-past 7 the pulse was 78, the respiration 24; his intelligence undisturbed, his answers prompt. Would you expect any further danger from shock?" *Answer:* "There is one question I did not understand: 'the pulse was low.' What does that mean?"

Question: "That means it was scarcely perceptible." *Answer:* "Was it quick or slow, and how long was it scarcely perceptible?"

Question: "There is no doubt but what he had a shock, but afterwards had recovered from the shock, and his pulse was 76, and the respiration 24." *Answer:* "Evidently that was no shock."

Question: "A reaction had occurred?" *Answer:* "You have not read any of the symptoms of shock as yet."

Question: "There is no doubt that after the injury there was shock; take that *as a basis;* his pulse was 76, respiration 24, his intelligence undisturbed, his answers prompt. Would you apprehend any further danger from shock?" *Answer:* "No, sir."

Question: "If, in such a case, at half-past 10 o'clock, or from 10 to half-past, the pulse and respiration were normal, his color simply pale, and at 11 P.M. reaction was further established, the condi-

tion of the patient has improved, and you find he becomes sleepy, but is rational, perfectly so, as long as he can be roused; that this sleepiness lapses into coma, with noisy respiration; the pulse runs up to 130, the respiration remains at 18, and that in the morning from 8 o'clock till 10 and three-quarters he cannot be roused. What would you then suspect from that condition?" *Answer:* "One of two things, either morphine-poisoning or *death* from *uræmia.*"

This naturally led to a long discussion, rather than an examination, as to uræmia, which is a poisoning of the blood due to a non-elimination of the urea from it by the kidneys. Finally, the discussion ended by the witness stating that the man died from opium-poisoning.

This examination gave an opportunity to the learned counsel for the prosecution to practically nullify the force of the direct evidence of the expert, although he failed in his attempt to break it down. For the answers were the only correct ones an educated physician could make, who had no previous knowledge of the case.

This occurrence compelled the defence to call on Dr. McCready, which they should not have done, as he was obliged to admit that he had acted as their coach, and in consequence had a pronounced bias on the opium theory. The same question was given him, but leaving out "the pulse was low."

Dr. McCready qualified his answer: "*In a previously healthy man,* I should have no doubt but

that the man was laboring under the influence of narcotic poisoning."

Finally said: "From the hypothetical question, I have no doubt the cause of death was directly from the opium or the morphine. It was not shock, it was not peritonitis, it was not uræmia. He being a *healthy man*, *uræmia* and *brain-disease* were *excluded.* It was *opium*, and *nothing else.*"

This question had been previously given to Dr. Carnochan in a somewhat modified form, as it included his observations at the bedside and autopsy, therefore based on a previous knowledge of the case.

To the *first portion* of the *question* Dr. Carnochan answered in substance, that there was no further danger to be apprehended from shock. To the *second portion:* "Well, I should ask somewhat in regard to the treatment." This also led to a discussion, until the learned counsel finally framed the following *question:* "From the statement I have given you in regard to the quantity of opium used, and the form in which it was administered, his condition at the time you saw him, and his condition at the time of the examination, what is your opinion as to its effect upon the patient after you saw him?" *Answer:* "That amount of opium or morphine would tend to produce a narcotism. The *stertorous* breathing can be *explained* by the *opium*, and it *required* something of that kind to *explain* the *stertorous* breathing."

As to the quantity of morphine administered.— The prosecution had shown that besides the first

half (½) a grain of morphine administered in solution, there were ten (10) drops of Magendie's solution administered at one time, twenty (20) drops at another, then fifteen (15) drops, and finally another fifteen (15) drops, which would make sixty (60) drops. The defence endeavored to prove by the evidence of Dr. McCready that these sixty (60) drops represented ninety (90) minims or a drachm and a half, therefore three (3) grains of the morphine instead of two. The doctor testified that there were only forty (40) drops of the solution to the measured drachm. True! But as some pharmacists prepare Magendie's solution by weighing the distilled water as well as the morphine, which is the *only correct method*, whilst the majority prepare it by measurement, according to the rules laid down in the United States Pharmacopœia in the preparation of similar solutions—for this is not an officinal one—and is *manifestly unreliable*, as to carry out its requirements would necessitate an equable temperature of the graduated measure and of the distilled water, also an exact level, it may well be imagined what reliability can be placed on this method. This evidence is by itself *without value*, but would have been of *great importance* if they had *proved* by Mr. Farwell, the pharmacist, the method he had made use of in preparing the solution, and if done by measurement, whether the graduate had been tested, its temperature and that of the water noted, and was the level exact. Dr. McCready also testified that the drop is a variable quantity.

There is no doubt about the accuracy of that evidence; but as Dr. Tripler and Mr. Farwell both testified that the solution was obtained in an ounce vial, either that one, or another exactly like it should have been placed in evidence, as the drop varies with the length, thickness and diameter of the nozzle. This evidence was, therefore, also worthless, because the defence failed to corroborate by that of Mr. Farwell and of the vial. Yet the whole was of great importance, for it would have conclusively established the fact that Fisk had actually taken, or been administered, three and a half (3½) grains of morphine, instead of two and a half (2½) or the equivalent of twenty one (21) grains of opium instead of fifteen (15) grains, as sworn to by the witnesses for the prosecution. It is surprising that the defence should have overlooked this point, for it would have *determined beyond cavil* the fact of opium-poisoning, and would have had much more weight than *the reported bar-room conversation as to the administration of* 110 *or* 120 *minims of Magendie's solution.*

EVIDENCE IN REBUTTAL FOR THE PROSECUTION.

The defence having so well sustained their theory of recovery from shock, and death from opium-poisoning, it became absolutely necessary for the prosecution to rebut, but the preceding evidence, as well as that offered by the prosecution itself, rendered it somewhat more than a herculean task; and if the defence had displayed the

same ability in cross-examining the witnesses in rebuttal that it did with the direct, it would have most effectually removed the last prop sustaining the elaborate medical structure of the prosecution.

The latter, alleging that it was their purpose "to show that the treatment was good," first placed Dr. Gurdon Buck on the stand. The District Attorney very skilfully examined this witness, and proved by him that opium was one of the primary indications in the treatment of severe gunshot wounds of this nature; and that the proportion of the dose, and the frequency of its administration, necessarily varied with the peculiarities of each individual case. The prosecution, however, committed a grave error in the opening of the examination, as follows:

Question: "In a case where a man is wounded by a pistol-ball passing into the abdomen, passing through and through two smaller intestines, through, into, and out again of the large intestines, and then lodging in the neighborhood of the thigh-bone,—would you consider it good treatment to give opium in case of great pain?" *Answer:* "Yes, sir."

Question: "Is it good treatment to give morphine in case of great pain?" *Answer:* "Yes, sir; *but rather as a palliative.* From the wound you describe, I should infer, almost necessarily, a fatal result, and the patient is entitled to all the relief that can be afforded from his sufferings during the time he survived."

This gave the defence a fine opportunity, in their

cross-examination, to break down this evidence, but they failed to avail themselves of it. For there were *no means* by which the *exact nature* of this *wound* could be *determined* during *life*. If the clinical history of the case from twenty minutes past four o'clock in the afternoon, or from the receipt of the wound until eleven o'clock in the evening, had been given in the form of a *hypothetical question*, and the Doctor asked: If he would then only have given morphine as a palliative, with a view to render the last moments easy? his *answer* would no doubt have been rather different. Then this:

Question: Would you give to a patient whose peculiar idiosyncrasies were unknown to you, suffering from a penetrating gunshot wound of the abdomen, who, three hours after the receipt of this wound, say at "a quarter before seven, appeared to be uneasy and complained of pain in his bowels," at half-past seven one-quarter ($\frac{1}{4}$) of a grain of morphine by the mouth; at a quarter before eight, his pulse 74, respiration 26, still complaining of pain, another quarter ($\frac{1}{4}$) of a grain of morphine by the mouth; at a quarter past eight, "his pulse 72, respiration 20, has been quiet at times, but mostly restless and uneasy, pain persistent, 10 drops of Magendie's solution" (half ($\frac{1}{2}$) grain of the salt); at twenty-five minutes of ten, "pulse 72, respiration 32, skin warm and moist, pupils contracted, complaining of great pain in the bowels, 20 drops of Magendie's solution (one (1) grain of the salt) by the mouth; at five minutes

before ten, pulse 80, respiration 34, still complaining of pain, 15 drops of Magendie's solution (three-quarters (¾) of a grain of the salt by hypodermic injection);" at a quarter before eleven, still complaining of great pain and distress in the abdomen, then insert another 15 drops of the solution in the arm" (three quarters (¾) of a grain of the salt), which would make in all (*according to the sworn evidence, but not in fact, for the exact amount was three and a half* (3½) *grains*), two and a half (2½) grains of morphine, in less than three hours and fifteen minutes, one grain and a half (*two grains in fact*) by the mouth, and the last grain (*one grain and a half*) by hypodermic injection? *Answer:* If in the affirmative.

Question: Is there not more or less shock in wounds of this kind, does it not temporarily paralyze the action of the stomach, and would this not interfere with the absorption of morphine? *Answer:* It might in a measure.

Question: Then is there not danger, when that quantity of morphine is administered at such short intervals, that the grain and a half in the stomach might not be absorbed until after the administration of the one grain injected under the arm, and before the physiological action of the latter had passed off, thus causing the *cumulative* action of the equivalent of 15 *grains* (21 *grains*) of *opium?* *Answer:* Possibly.

Question: If at 11 P.M. the patient's pulse was 90, respiration 32, was more or less affected by the remedies that had been used, his pupil contracted,

but sensible to light; at 12 M., pulse 100, respiration 26, asleep; at 2 A.M., pulse 126, respiration 20, he awoke and remarked that "he felt first rate." Two ounces of brandy and water were given him, and he *soon fell asleep;* at a quarter past 4, whilst a conversation was going on in the room, he awakes and says that "He felt easy, and asked for a drink of water, took it in his hand and drank it, raising his head somewhat, and fell asleep *again.*" His *pupils* pretty well *contracted*, but reacted to a candle, his pulse 128, and respiration 22. Would it not be an indication of partial narcotism? *Answer:* Possibly it might be so.

Question: Now, sir! if at 5 A.M. the patient was sleeping soundly, and did not answer when spoken to; at 20 minutes past 5, his pulse 135, respiration 20 and irregular, an effort was made to rouse him and failed; at half-past 6, pulse 130 and weak, respiration 20, pupils still sensible to light, could not be aroused; at 8, pulse 130, respiration 18, pupils contracted but sensible to light, unconscious in a state of coma, breathing heavily or stertorously, and could not be aroused by any ordinary means; at 10, pulse 130, respiration 17, and from that time forward there was a gradual diminution in the regularity of the pulse and respiration, the latter labored or stertorous until he ceased to live at 10 minutes before 11 A.M.,—would that indicate death from *shock*, that is, death beginning at the heart either by syncope or asthenia? *Answer:* (It would be safe to assume that it would be an emphatic) No, sir.

Question: Would it indicate death beginning at the head or by coma? *Answer:* Yes, sir.

Question: Now, sir! taking the whole case into consideration, the fact that *no observation* was made as to the *condition* of the *pupils* after 8 *o'clock*, so that it is *not known* whether they became *firmly contracted* and insensible to light, or *finally dilated;* and there were no evidences of uræmia or of disease of the brain, not forgetting the administration of two and a half grains (*three and a half*) of morphine in an interval of three hours and a half,—what would, in your opinion, have caused the death by coma? *Answer:* The morphine or opium.

If this hypothetical question had been given to Drs. Carnochan and Jacobi it would have compelled them to answer categorically, and would have embraced the whole case presented by the witnesses for the prosecution; thereby preventing a confusing cross-examination. Then it would, in the cross-examination of Drs. Buck and Hammond, have completely nullified the force of their direct evidence.

Dr. Hammond, in his direct evidence, cautiously given, said that "The proper treatment for wounds involving the intestines is to keep the bowels as quiet as possible, and that is accomplished by administering large doses of opium." "I would give a sufficient quantity of opium in the first place to prevent any operation, any action of the bowels, and in the next to mitigate any pain that might be present, and also with a view to prevention of

shock. I have given as much as three (3) grains of opium (*half of a grain of morphine*), every *two or three hours* in cases of wound and in cases of shock." "I think it would be safe to give as much as *ten* (10) *minims* of Magendie's solution (one-third of a grain of morphine), every *three or four hours*, or probably more if he were a strong man." "I could scarcely fix the limit, I would give enough to subdue the symptoms—as long as unconsciousness is not produced there is no danger."

Question: "Suppose the respiration kept at 16, 17, or 18?" *Answer:* "I have seen one case in which there was respiration to that extent, in opium-poisoning, in which the patient died, but I have not seen anything of the kind before or since."

"A very exceptional case."

It is evident that this testimony was rather in favor of the defence, and it is the strongest part of the Doctor's evidence. The remainder could have been completely nullified by critical cross-examination, as the direct in its questions presented the facts to suit its theory, and not as they appeared in evidence.

The defence began its cross-examination of the witness with its long hypothetical question, not making any allusion either to coma or stertorous breathing, and leaving the Doctor under the impression that the morphine had been entirely administered by hypodermic injection, which very naturally brought out the following *answer:*— "Well, I think *he died of shock*, and my reasons

for it are these: If he died of morphine, and I may state that is sufficient morphine to kill a man under some circumstances, and in an ordinary condition probably, he would have become unconscious very soon after the administration of the drug, and that unconsciousness would have gone on increasing, and he would have died unconscious, his respiration would have become slow. The fact of his rousing six (6) hours after having taken the last dose of morphine is, to my mind, utterly *incompatible* with his having *died* of *morphine.*"

This answer was necessarily fatal to the theory of the defence, and it became very important to neutralize and destroy its effect. For that purpose the defence floundered about, and taking as a basis the previously mentioned "bar-room conversation," propounded the following *question:* "Supposing he had received in the course of the night, between half-past 11 and 4 o'clock in the morning, one hundred and ten (110) minims of Magendie's solution hypodermically administered, together with one-third of a grain of morphine administered by the mouth." This amount was certainly sufficient to have killed. It was corrected by the Court's stating that "there was none taken afterwards" (after 11 P.M.). This gave the defence time to collect itself, and, falling back on Taylor's work on poisons, read the following extract as a *question:* "A man swallowed an ounce and a half of laudanum, in an hour and a half he laid down in bed, and some excitement was followed with numbness of the extremities; but he continued sensible and

lively for seven hours and a half after, so that the medical man did not believe his statement, and it was not until eighteen hours that stupor commenced, and in two hours the symptoms of poisoning by opium were of an aggravated kind?"

Answer: "That is a different case entirely, the drug was taken into the stomach, and something might have interfered with the absorption of the drug, so that it did not get in the system, but here it is put under the skin, and gets into the system at once. I can well understand how a man taking a large quantity of laudanum on a full stomach, that *the stomach might not absorb it*, and it *would be as much out of the system as if it were in a tin cup.*"

Here was the opportunity for the defence to correct its palpable error. 1, One grain and a half of morphine had been administered by the stomach; and 2, the shock by temporarily paralyzing the action of the stomach had delayed the absorption of the drug until its final absorption caused the cumulative action of the whole amount administered. But it was not made use of, and some immaterial questions asked. This enabled the District Attorney in his re-direct to impress more fully on the minds of the jury the witness's answer to the elaborate hypothetical question of the defence; *ergo* the man *died of shock*, not of morphine.

Dr. Sayre was also recalled in rebuttal; the most salient point of his evidence was brought out by the Court. *Question:* "You stated in your direct examination that the great sympathetic

nerve had been injured by the ball?" *Answer:* "Yes, sir."

Question: "Did that have any effect upon the death?" *Answer:* "It would produce inevitable death pretty much in the manner of prostration that this did take place. The *centre* of the *sympathetic nerve* was injured, which was the cause of this great prostration."

This evidence was certainly damaging to the defence, at least might have been in the minds of the jurors; but it could have been effectually refuted by a skilful cross-examination compelling the witness to give direct answers, showing that the wound described was a hypothetical one, and that it was impossible for the solar plexus, which is the abdominal centre of the sympathetic, to have been wounded, as it is situated behind the stomach, whilst the bullet passed down towards the *anus*.

EVIDENCE AS TO THE PROBING.

It is not my purpose to discuss this question, for most of the points raised by the defence were simply absurd. The direct evidence showed that the probe had not been introduced more than three and a half or four inches, whilst the oblique course of the wound and the thickness of the abdominal walls proved that it had not been carelessly done. Moreover, Dr. Carnochan, principal witness for the defence, admitted that "he would have done it himself, and that if the probe did not penetrate into the cavity of the abdomen it could have done no harm."

As regards the use of a broken or partially dis-jointed probe, it was shown to have been broken subsequent to the death of the victim. The learned counsel no doubt thought that it might influence the jury, but that is not medical jurisprudence.

The learned counsel for the defence also "made much ado about nothing," as regards a caucus held by the doctors appearing for the prosecution, or, as he styled it, "Remarkable gatherings." Counsel who would go into a case without first ascertaining what his witnesses were going to testify to, would neglect his duty and the interests of his client. If the prosecution failed to do it in this case, or to take due advantage of it, they are responsible for a great oversight on their part.

The learned counsel for the prosecution, in his cross-examination of the witnesses, had at times a fine opportunity, but seemed to confine himself almost entirely to the effort to demonstrate to the jury that there was a personal feeling of one of the leading witnesses for the defence against one for the prosecution; also a spirit of antagonism and rivalry between the regular practitioners of medicine, or so-called allopaths—who are always called on in preference as experts in science—and the homœopaths; further, that one of the experts had received a fee, and that another expected one. As the law recognises the right of an expert to a fee, this was uncalled for. Moreover, it was *not conducting the prosecution on the merits of the case, and was an evidence of weakness.*

In this country and in England license and cus-

tom permit counsel to conduct his examination in that manner. But this is not treating members of a kindred profession with the courtesy due them when called upon as experts. The defence might with equal propriety have endeavored to prove that the learned counsel assisted in conducting the prosecution through motives of personal malice towards the prisoner at the bar. For neither of these are pertinent to the merits of the case.

This practically closes the medical jurisprudence of the first trial. The second point, as to the bearing the direction of the two wounds had on the relative positions of the aggressor and his victim, was only brought prominently forward in the third trial, and I will therefore discuss it in connection with the evidence of that trial.

SECOND TRIAL.

The jury having disagreed in the first trial, a second one became necessary. The prosecution only called upon the deputy coroner to testify as to the post-mortem evidences. The defence admitted the killing, and relied exclusively on the theory of self-defence and justifiable homicide, which resulted in a conviction of murder in the first degree.

THIRD TRIAL.

The prosecution again called the deputy coroner to the stand. Had the report of the post-mortem been more lucid and exhaustive, even his evidence could have been dispensed with. In draw-

ing up the report of a post-mortem examination in which there is even the faintest suspicion of a crime having been committed, not a single item should be omitted. For instance, in this one no mention is made as to the condition of the edges of the wound on the anterior surface of the arm, or of those of the one on its posterior surface. There is only an opinion as to the points of entrance and exit of the ball expressed. This is not sufficient, for mere expression of opinion, unless called upon as an expert, is not evidence; and if the deputy coroner had simply described the exact condition of this wound, his report would have been of more value than any subsequent oral evidence. For an expert could then—by taking it into consideration with the deceased's ante-mortem, the prisoner's own evidence, and if the coroner had conducted a more searching investigation as regards the topography of the stair-cases, the precise point at which the ball was found, if there were any marks on the south-side wall, as to the holes in the cloak and clothing—have shown whether the prisoner's statement as to the position in which he alleged his victim's hands were in, was true or not. *This was the pivot upon which the case for the prosecution rested through three trials, and yet they failed to see it.*

This, however, is not the only error of omission: for the lateral and antero-posterior angles of direction of the ball through the abdomen are not stated; and this was of *vital importance*, for it would have shown the degree of elevation and obliquity at which Stokes stood as compared to

the position of Fisk. The condition of the membranes covering the brain is overlooked. To say the brain is healthy only includes its meninges by implication, and the *law* on *questions* of *fact implies nothing.* Then to say the lungs were free from disease, does not imply absence of so-called hypostatic congestion. These errors of omission led one of the experts in the first trial to decline basing an opinion on that report. In the third trial it led to the defence's endeavoring to prove by two witnesses that there was a serous effusion in the brain and its meninges, which I do not believe they would have attempted if the report had been complete in all its details.

The defence called on Drs. McCready, W. H. Thompson, Charles A. Leale, Carnochan, Shine, and Fisher. The latter gave the clinical history of the case, and in his cross-examination strongly defended the judiciousness of the treatment.

Dr. Carnochan's evidence was a repetition of his previous testimony, if anything more concise and to the point. The defence brought out what they considered an important fact; it was that "when the brain was weighed the towel in which it was placed became saturated with serum," that is, quite wet by the fluid exuding from the brain.

Dr. Shine corroborated this point of Dr. Carnochan's by stating that *he observed* "an effusion of serum beneath the meninges (or membranes covering) the brain."

Dr. McCready's evidence was substantially the same as on the first trial.

Dr. W. H. Thompson in his testimony sustained the views of Drs. McCready and Carnochan as to recovery from shock, and death from opium-poisoning.

Dr. Chas. A. Leale was essentially called upon to demonstrate by his own experience, as well as by the Surgeon-General's report, that there were a number of remarkable cases of recovery from gunshot wounds of the abdomen, with lesions of the intestines.

The defence in this trial held the prosecution at a great vantage. They could mould the evidence to suit their theory of opium-poisoning, and present the case in its most concise form; also compel, by exclusion, the prosecution to call on witnesses which would injure its side of the question, and sustain the theory of opium-poisoning.

The prosecution, in rebuttal, called on Drs. James R. Wood, Gurdon Buck, Alpheus B. Crosby, and Marsh.

The learned District Attorney committed a grave error by placing Dr. Wood on the stand; and if he had carefully read the evidence given on the first trial, he would have seen that the Doctor was a dangerous witness. For if, as before mentioned, the defence had dared to show their hand in the first trial, his evidence would have been just as strong in favor of the opium-poisoning theory as in this one. It was in this that the defence showed capital discrimination by compelling the prosecution either to practically admit the opium-poisoning theory or to refute it. For this it was abso-

lutely necessary to call upon at least one of the physicians and surgeons who attended the deceased in his last illness.

Moreover, the Doctor was obliged to admit, "*that in view of our present knowledge and experience, the wound of the deceased could not be considered as necessarily unavoidably fatal.*"

Dr. Buck, in his direct examination, in answer to the hypothetical question, based on the post-mortem examination of the wound, stated that "it was inevitably fatal." The defence, in their searching cross-examination, neutralized the force of this assertion, and compelled the witness to admit, in answer to a hypothetical question, based on the prominent symptoms during life, that the *shock* must have been *very slight*, and that there were *symptoms* of *narcotic poisoning.*

Dr. Marsh was recalled to rebut the evidence of Drs. Carnochan and Shine, as to the existence of serous effusion in the meninges and ventricles of the brain. The Doctor asserted that there was none, but admitted, in his cross-examination, that he had omitted to mention the condition of the meninges of the brain in his report of the post-mortem, and that Dr. Shine took down the notes at his dictation, but did not put down what he (Dr. Shine) might have seen. The existence of this effusion would certainly indicate a cerebral lesion, which, found to exist in a subject who had died with symptoms of narcotic intoxication, would give rise to a suspicion of opium-poisoning, but would not *per se* afford positive evidence. It

would have to be confirmed by the proof of the administration of opium, or one of its salts, or by a chemical analysis. The defence, no doubt, introduced this testimony in this trial for fear that its non-existence would be cited as evidence of the absence of opium-poisoning. This question was raised by the evidence of Dr. Jacobi in the first trial, but is of no importance, as the weight of authorities agree in that it may or may not be present.

Dr. Crosby rather sustained Dr. Buck's views as to the fatal consequences of this wound, but admitted that as there were no evidences during life of its precise extent, that he would have carried out the treatment on the principles of possible recovery.

The evidence of this witness was chiefly remarkable by his having been called upon to prove Fisk's death from shock, by citing an analogous case occurring in his own practice.

In this case the victim received a penetrating gunshot wound of the abdomen, above the umbilicus and below the ensiform cartilage (terminal end of the breast bone). The Doctor saw him a few hours after the receipt of the injury, and found him suffering from shock. A quarter ($\frac{1}{4}$) of a grain of morphine was then administered by the mouth; in 4 hours, an eighth ($\frac{1}{8}$) of a grain; in 4 hours more, an eighth ($\frac{1}{8}$) of a grain; in 8 hours, another eighth ($\frac{1}{8}$) of a grain; finally, in 8 hours, an eighth ($\frac{1}{8}$) of a grain; making, in all, six-eighths ($\frac{3}{4}$) of a grain of morphine. The Doctor saw him

a few hours after the administration of the last dose; the patient was then *insensible* and *breathing stertorously.* Narcotic poisoning was immediately suspected, and inquiry made as to the exact amount of morphine given. The stertorous breathing was then accounted for by one of the gentlemen present stating that the patient, when in health, usually snored. The victim gradually sank, dying forty-six hours subsequent to the receipt of the injury, and less than twelve hours after the administration of the last dose of morphine.

This was a most unfortunate case for the *prosecution* to advance in support of the view of death from shock *versus* that of opium-poisoning. For it fully sustained the latter theory: 1. The morphine had been carefully administered. 2. The shock and consequent paralysis of the stomach prevented the immediate or gradual absorption of the drug. It remained there "*as much out of the system as if it were in a tin cup,*" until the reaction from shock permitted of its absorption *en masse,* as if it had been administered in a single dose. 3. Its sudden absorption thus led to the cumulative action of the small amount of three-quarters ($\frac{3}{4}$) of a grain of morphine, the equivalent of four and a half ($4\frac{1}{2}$) grains of opium; and 4. The peculiar idiosyncrasy of the individual led to a fatal result.

After the post-mortem, as nothing sufficient was found to account for death, as in Fisk's case, it was attributed to shock. This in face of the evidence of stertorous breathing, which cannot possibly oc-

cur coincidentally with shock. For stertorous respiration, as previously mentioned, is accompanied with deep and prolonged inspiratory efforts, and one of the first symptoms of absolute recovery from shock is a succession of deep inspirations.

Yet the *prosecution* would have us believe that this man died from shock, when he was, according to one of the gentlemen present, *snoring as if in a natural condition.* This is simply going into the *reductio ad absurdum*, for this case fully sustains the theory of opium-poisoning in that of Fisk's. Like it, a *fatal result* was due to the *cumulative action of opium.*

It is worthy of remark, that in this extraordinary case the cumulative action of opium, which formed the basis of its medical jurisprudence, was never advanced by the defence as the cause of the toxic effect of the drug.

We will now pass to the consideration of the second point:

AS TO THE BEARING THE DIRECTION OF THE TWO WOUNDS HAD UPON THE RELATIVE POSITIONS OF THE AGGRESSOR AND HIS VICTIM.

In the first and second trials the only allusion made to this was by the prosecution, and it was more in reference to Fisk's throwing up his left arm, after the receipt of the abdominal wound, and receiving the second wound above the elbow. The defence did not even mention it.

The direction of the wound in the abdomen, or rather the course of the ball through the latter.

from right to left, from above downwards and inwards, conclusively demonstrated that the deceased was standing on the south or left-hand side of the stairs, and Stokes on the north or right-hand side. This evidence was far more positive and reliable than Tommy Hart's, for it afforded undeniable, uncontrovertible proof of the relative positions of the assailant and of his victim. Moreover, it was of paramount *importance* to the *defence*, for it *sustained* Stokes's *evidence.*

The wound in the left arm was of great importance to the prosecution—one of its most reliable witnesses—and *its veracity was unquestionable;* but no direct expert evidence, save that of the District Attorney's, in the respective trials, was brought forward to explain it. According to the evidence of Dr. Marsh, the direction of the wound and course of the ball was as follows: The point of entrance, as shown by the inverted edges of the wound, was on the inner side of the left arm, one inch above the crease or bend of the elbow, then upwards, backwards, and inwards, through the tissues of the arm, under the bone, then passing out of an opening, with everted edges, on the posterior surface of the arm, five inches above the olecranon process (tip of the elbow).

The direction of this wound shows that the arm must not only have been raised to an angle above the shoulder, but that the arm was thrown forward at a right angle with the body; yet according to the evidence of the deceased it may have been, and probably was, at an obtuse angle at the moment

the ball entered the arm. This sustains the prisoner's statement as to his position relative to that of his victim, but it as effectually contradicts his assertion as to the position in which he alleges Fisk's hands were in holding a pistol.

The *prisoner* said that he had descended three or four steps on the south side of the staircase, when he suddenly saw Fisk coming up, in consequence of which he quickly sprung to the north side, resting his left hand on the banister, drew his pistol from the outside pocket of his overcoat, and fired two shots in rapid succession.

The *deceased* in his *ante-mortem:* "I came through the outer door and was going up-stairs, and *had gone up two steps*, when looking up I saw Stokes at the head of the stairs. As soon as I saw him I noticed he had something in his hand, and a second afterwards I saw the flash, heard the report, and felt the ball enter my right side. A second shot was fired immediately afterward, which struck my left arm. When I received *the first shot I staggered* and ran towards the door."

Fisk had on a military cape. The two holes on the left side, taken in connection with the wound in the arm, demonstrate that it fell over his arm; then this coupled with his ante-mortem statement: "had gone up two steps"—"and felt the ball enter my right side"—"when I staggered," proves beyond a doubt that his left hand, whilst in the act of ascending the stairs, rested on the side rail, his arm thrown forwards, and when he received the first shot he staggered and was turning to-

wards the door, which brought the arm to an obtuse angle with the body, and at one above the shoulder, as the second ball struck the arm. Moreover, the perforations in the front of left side of the cape, and the one in the back, prove this, which would have been further corroborated if the Coroner had taken evidence as to the precise place at which the bullet was found, and in case it struck the south-side wall, at what point. However, the angle of deflection and the relative position of Fisk and Stokes prove that the ball could not have struck the wall, as its velocity was spent after it had passed through the arm and cloak, and must have fallen at the foot of the stairs, on the south or left-hand side.*

There is therefore no doubt that if this evidence, which came as if it were from the grave, had been properly *considered* and *appreciated* by the *prosecution*, it would have gone further towards the conviction of the prisoner of murder in the first degree, than all the combined evidence of the boys Hart and Redmond; for the proverb which the learned counsel, Mr. Tremain, applied with such telling force to Tommy Hart, *Falsus in unum falsus in omnibus*, would have been applicable with even

* Dr. R. W. Taylor informed me that I was mistaken on this point, as there was a mark on the south-side wall above the hand-rail. I then examined it with him, in company with Mr. Crockett, and fully satisfied myself that it could not have been made by the bullet from Stokes's pistol, as it was within six steps from the upper landing; and Fisk could not have been as high up, unless we reject his ante-mortem statement, also the evidence of Houseman, witness in the second trial, and that of Vinot for the prosecution in the third trial. Moreover, Mr. Powers states that it existed previous to the homicide.

greater force to the would-be assassin Stokes; for although it sustained his evidence as to their relative positions, it as effectually refuted it as to the position he alleged Fisk's hands were in holding a pistol.

That the defence fully appreciated the importance of this evidence was shown by the ability with which the learned counsel, Mr. Brainerd, in the third trial, made use of the prosecution's own model of the staircase, and of its rebutting witness, Dr. Wood, to prove that the direction of the wound in the abdomen clearly demonstrated that the relative positions of Fisk and Stokes were not as sworn to by Hart, but as sworn to by the prisoner. No allusion was made to the wound in the arm by the defence; they apparently avoided it, *no doubt for reasons best known to themselves.*

The perforations on the right-hand side of the cape showed that the right forearm of the deceased was slightly flexed on the arm, and that the hand rested on the abdomen, below the navel and above the pubis.

The prosecution apparently attached much importance to placing in evidence, towards the close of the last trial, the cloak and wearing apparel of the deceased, and consequently had it donned by an officer of the Court, notwithstanding the strenuous objections of the defence. The latter might have spared themselves the trouble, for by being placed in evidence at this late hour, without the corroborative evidence of the course of the two balls through the body, it had simply degenerated

into a harmless public exhibition. Moreover, its value as evidence was impaired by the Coroner's neglect in not taking charge of it at the ante-mortem. The prosecution had conclusively demonstrated the want of a proper appreciation, if not complete ignorance, of the first principles of medical jurisprudence, by not presenting it either in their direct evidence or in their rebuttal, in connection with the wounds and the position of Stokes and Fisk on the stairs. It is possible, however, that they may have considered the more than doubtful testimony of Tommy Hart, more reliable than this undeniable, irrefutable evidence.

EMOTIONAL INSANITY.

On this point there was no medical evidence offered in any of the trials, and the learned counsel for the defence showed their appreciation of the strength of their case by not calling in any to substantiate it. But profound admiration for the manner in which they introduced evidence bearing on that point, compels me to notice it.

This defence, owing to the exclusion of evidence in the two preceding trials, which was admitted in this one, in virtue of the decision of the Court of Appeals, was only brought forward in the last trial. It was first shown that there had been insanity in the prisoner's family, then evidences of Fisk's threats against the prisoner, and, finally, the constant apprehension of the latter lest the former's emissaries should compass his death, were skilfully brought out, and establishing a peculiar emotional

condition which might at any moment explode; this by unimpeachable witnesses, and who had no special regard for Stokes. Moreover, the prosecution brought this mental condition down to the very day of the shooting—to within a few minutes previous to the homicide, by introducing his honor Recorder Hackett, as an expert *post hac vice*, who stated that he saw Stokes standing in front of the Grand Central Hotel, "as if anticipating; his face was excited." It is evident that the learned counsel merely looked upon this issue as one of the many straws counsel make use of to influence a jury.

CONCLUSIONS.

The medical jurisprudence of the Stokes case thus proves that:

1. The shooting of Fisk was not done in self-defence, but with premeditation; and

2. The wound in the abdomen was not necessarily fatal, and that the morphine was the immediate cause of death.

These thus proved an attempt to commit murder in the first degree.

The learned Judge Davis, who presided at the last trial, fully appreciated this, and with his usual discrimination and perspicacity on questions involving principles of law, thus expressed it in a most lucid manner to the jury, in the following extract from his charge:

"The exact point I submit to you is this: If morphine, improperly administered, either as to the

manner or as to the quantity, caused the death of James Fisk, Jr., on the seventh of January, not as an accelerating cause, *but an independent cause, being in itself the sole agent producing death at that time, then the prisoner is not chargeable with the death, because another and an independent agent produced that result in which his act*—the wound he caused—*did not occur.* But if you should come to the conclusion that the deceased died solely from the effects of morphine administered, *it by no means follows that the prisoner in this case is not to be convicted.* An independent agency stepping in to cause death independently of the wound, simply arrests a crime before its complete consummation. As, for instance, in the North Carolina case, where C came in and by a murderous blow killed the party instantly, the act of A, who had intended to kill him, and had inflicted a fatal wound with that intent, failed to ripen into murder, because an independent act took from his act the result that would follow. Therefore, in this case, assuming that you find he inflicted the wound with the premeditated design to cause death, he is liable to be convicted of the crime of *an attempt to commit murder in the first degree.*"

The above are *post hoc* conclusions on a *res adjudicata*, and therefore of but little practical value as applied to the merits of this case. Moreover, it would indeed be an instance of a *mons parturiens*, were not all the points in the whole case pregnant with importance as regards the urgency of a change—

I. In the manner of conducting *ante-* and *post-mortem* inquests by the coroners; and

II. A modification in the introduction of expert testimony into criminal trials.

For all the cases referred to in the opening afford a striking illustration of similar points.*

In closing, I wish to express my thanks to Mr. Cephas Brainerd, of counsel for the defence, for his

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* In a paper on Medico-legal Toxicology, read before the Medico-legal Society, at its stated meeting, February 27th, 1873, I presented the following conclusions and suggestions:—

"It would therefore be advisable in all cases of suspected poisoning to act upon the presumption that the nature of the poison is unknown, unless the data are clear and unequivocal; for the *ipse dixit* of the medical jurist should have *no more weight* than *circumstantial evidence* with the legal chemist, if the latter wishes to base himself on grounds which the *legal acumen* of the counsel, aided by a sound knowledge of medical jurisprudence, will not strike from under him, destroying his reputation as an analytical chemist, leaving him and the débris of his analysis as incongruous a mass as the wall which falls under the blows of a pick.

"The medical jurist and legal chemist of the present day, by becoming votaries and exponents of science, incur an additional responsibility. Every *mistake* they make is cast up *against* their *science*, which is making giant strides towards *positivism*. Moreover, they cast an *unjust*, an *unmerited reproach* on their *professional brethren*. The *medical expert*, whether he appears for the *prosecution* or the *defence*, *owes* it to his *profession*, to his *brethren*, to *testify* according to his *honest convictions*. His *answers* ought be *categorical* if possible. In other words, he should act as *amicus curiæ*. By acting otherwise he *prostitutes his profession*.

"The *ex-parte* investigations, such as were conducted in the Wharton-Ketchum trial, ought not to be tolerated in criminal cases. It casts a taint, a suspicion of over-zealous partisanship on the proceedings.

"Nor should the Coroner's *ex-parte* post-mortem investigations be permitted. Not that I would cast a reflection on any of the gentlemen he might select to conduct the investigation; but the law allows the ac-

courtesy in giving me free access to all the legal records of the case.

The third trial was noticeable for the uniform courtesy with which the physicians and experts were treated by the learned District Attorney, Mr. Phelps, his able assistant, Mr. Russel, and by the learned counsel for the defence, Messrs. Tremain, Dospassos, and Brainerd,—the questions of fees to experts, and of professional antagonism, having been dropped by the former; and the probing, caucus meetings, and bar-room dosing with morphine, wisely ignored by the latter.

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cused in the final trial to produce witnesses in his own behalf on every point save this: it is unjust, and might be the cause of a legal murder. Schoeppe would never have been convicted on his first trial if the investigation had been conducted in the presence of a sworn expert, representing the interests of the alleged murderer, or acting as *amicus curiæ*.

"Therefore, as a representative of my profession, I respectfully recommend to the consideration of your honorable Society the propriety of petitioning the Legislature to pass a law covering this point, which might be the means of saving an innocent person, and would, *à fortiori*, lead to the conviction of the criminal. In making this appeal to you I feel that I am advocating the cause of justice and the cause of humanity, for I am not the only member of my profession who believes that one or more criminals, alleged criminals, have been executed on insufficient medico-legal investigations. Moreover, it would spare us the renewal of such indelible *stigmas* on the administration of American criminal law as the Schoeppe, Wharton-Ketchum, and Wharton-Vanness trials."

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